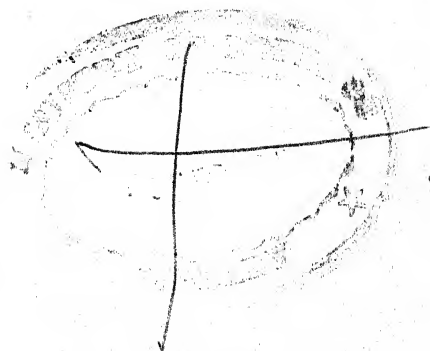


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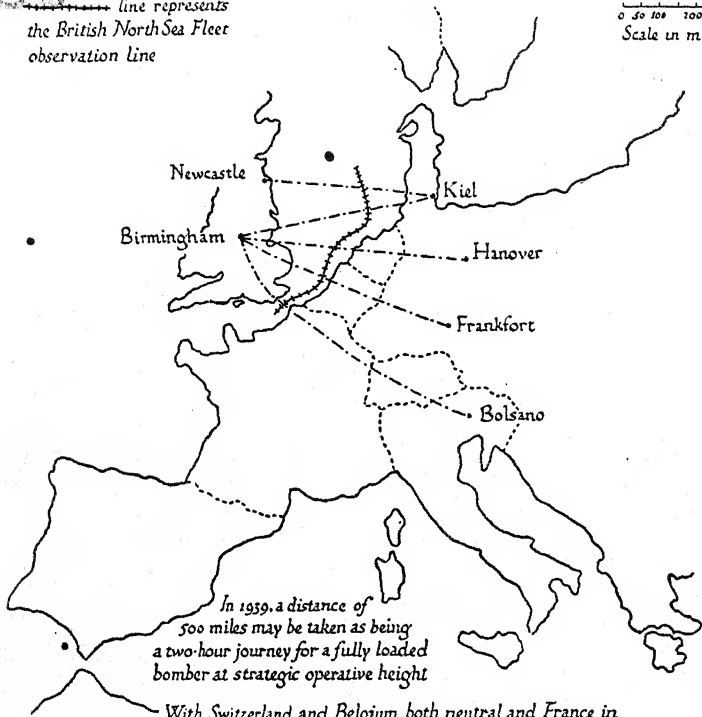
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Scale in miles



With Switzerland and Belgium both neutral and France in
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terprise would naturally follow a course slightly North-
East of the line Bolsano-Birmingham

Kiel to Newcastle 500 miles; Kiel to Birmingham 550 miles; Hanover to Birmingham 550 miles
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SKETCH TO SHOW THAT THE OBVIOUS AIR ROUTES FROM CENTRAL
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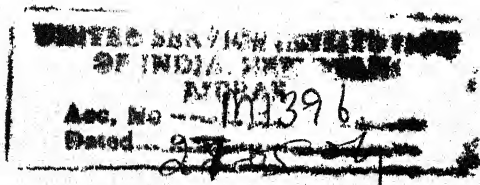
AIR STRATEGY FOR BRITONS

by "AJAX"

Foreword by LT.-COL. R. M. RAYNSFORD, D.S.O., D.L., J.P.

London

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FOREWORD

by Lieut.-Col. R. M. RAYNSFORD, D.S.O., D.L., J.P.

Editor of "*The Fighting Forces*"

Not the fear of war but the prevention of war! That is surely what matters most of all. The peoples of the world, as distinct from their leaders, hate the idea of another war with all its futility, its failure to achieve results, its trail of destruction, its aftermath of broken hopes and misery. Even the Dictators themselves realize that war is not worth while, unless a swift decision can be obtained. During the Great War it became increasingly obvious that a swift decision could not be gained either by land or by sea, and subsequent smaller wars have helped to support this conclusion. There remains only the air and to the few clear-headed exponents of military thought, of which the author of this book is a brilliant example, it is obvious that the air, just as much as the land and sea, does not lend itself to swift and overwhelming victory, provided the right action is taken to counter the bombing aeroplane.

But certain schools of thought in this and in other countries believe that the bomber will do the trick, and so on all sides a hideous race in bombing aeroplanes is being perpetrated. And with this view, that swift victory can be obtained by means of bombing aeroplanes, there goes the equally unproved claim, strongly upheld in this country, that the only satisfactory method of dealing with the bomber menace, is to bomb enemy towns in return.

"Ajax" counters both these theories forcibly and conclusively. The correct answer to bombers, he says, is fighters, and there is not the slightest doubt he is right. He has flown bombers and fighters both in peace and war, and if given his choice in a war to-day he would unhesitatingly plump for the fighter.

Those who point to the tremendously high speed that bombers can attain nowadays overlook the fact that the higher your speed the more difficult it is to hit your target, and that therefore high speed invites indiscriminate bombing. Can anybody in their senses believe that any virile nation will be conquered by indiscriminate bombing? Besides, however high the speed of bombers, the fighters can always go one better.

Our own country has much to answer for. We formed the Independent Air Force during the Great War for the purpose of attacking German civilians, and the unfortunate precedent therein established was followed from 1919 onwards on our own Empire frontiers. International efforts to restrict bombing to purely military objectives met with no response in this country. And now every country of any size has an Independent Air Force of its own.

Some of what "Ajax" has written in this book has already appeared in the shape of articles in *The Fighting Forces*. I welcomed the opportunity of publishing these articles because they drove home the point of view that the policy of air warfare preparedness in Britain should be concentrated in one direction above all others—

counter-bomber action. Counter-bomber action can be made so effective as to preclude any possibility of the aggressor gaining swift and overwhelming victory by means of bombing raids. When this fact sinks into the mind of the British, then in the mind of the other Great Powers the prospects of war will be materially altered and will probably be materially diminished.

"Ajax" is severely critical both of Royal Air Force operation and direction but his criticisms are always constructive. In short, he has written a fine, stimulating book of value not only to this country but to humanity as a whole.

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War is a continuation of policy

I. BASIS FOR ARGUMENT

It has been said with some truth that nations have a habit of preparing for the next war as though it was going to be in all respects similar to the last, whereas on the contrary a succeeding war is usually entirely different. Nevertheless some jumping-off place must be provided and this can be most usefully provided in the form of historical survey.

The war on the western front in 1914-18 from the point of view of a strategic theorist was a ghastly series of mistakes. The Prussian military mind and the endurance and spirit of the French and British troops combined to create such an impasse as has never before been known in the recorded history of war.

The first mistake was made by the Germans who insisted on finding out by repeated experiment what happens when an irresistible force meets an immovable obstacle. After they had found out, at a cost of nearly a million lives, the French and British tested the problem in the same way, at a cost of at least half a million lives. Although it was a mistake by all three commands, it was not an astonishing mistake. The generals concerned were attempting to apply a perfectly sound military strategic principle, that in order to defeat your enemy you must

first defeat his armed forces. The idea was correct if the methods employed were not. The generals opposed soldier against soldier, gun against gun, mine against mine, gas-pipe against gas-pipe.

The war in the air provided a contrast. Here it was not so much a question of aeroplane against aeroplane, as reconnaissance machine versus fighter, bomber versus fighter, and ground gunner against both. If the ground warfare was like a combat between two bulls, the combat in the air was more like a fight between cat and dog. In the air, just as it was impossible to dig in, so it was not possible to put up an impassable shell barrage.

During the war on the western front success in the air inclined first one way and then the other. Neither side could maintain superiority indefinitely. The British were at advantage with regard to personnel and material reserves, while the Germans were at advantage owing to the fact that in the early part of the war they gave their flying personnel superior training and owing to the fact that they had a less extensive purpose to serve. The contestants on both sides had started with very few squadrons, and possibilities for use of the air arm in various directions were only gradually realised as time went on. Each contestant at first built and equipped machines and trained personnel rather with a view to achieving an object for himself than in order to prevent the other fellow from achieving his objects. British fighter patrols over the enemy side of the line provided the first exception to the general rule, and German fighter patrols

over their own side of the line in the latter stages of the war provided the second. It is interesting to notice that the British initiative seems to have been due not so much to the British air staff as to the enthusiasm and warlike ardour of British fighter pilots adopting the principle of "It's a fine day and we feel good. Let us go out and shoot down some Germans."

Except for the provision on both sides of guns which could only put up fairly ineffective anti-aircraft fire, it does not at first seem to have occurred to Briton, German, or Frenchman that it would be a good idea to consider what were the purposes for which the other fellow was using his machines, and then make a determined effort to prevent the achievement of these purposes in certain specific directions. "Live and let live" was not applied in principle, but for at least two years it was to some extent applied in practice. The author of this book, while wrestling with a jammed machine gun on one occasion, received a cheerful wave from his intended victim who made no attempt to use his own gun. One does not want to be misleading. The British later on made great efforts to deny the air *in general* to the German. Sometimes for a short season they succeeded, but on the whole they failed. The author can recall only two attempts to deny *particular* targets to the enemy. One of these consisted of patrols in the air above General Headquarters at St. Omer in 1915, the other being similar patrols in the air above the hospital at Aire in which lay injured His late Majesty King George the Fifth.

Germany, France, and Britain fought their first air war in the offensive spirit. With far too few machines to make all-round defence possible, obviously the right thing to do was to attack. There had been no opportunity to think in terms of air warfare beforehand, for aeroplanes had only just arrived. The air, with its three-dimensional route, offered splendid opportunity for attack. When a war has begun it is rather late to be thinking of defence. In military circles in war time thought in this direction is discouraged, while even in peace time it is not encouraged. Nevertheless it is possible that the reason behind the military maxim, "attack is the best form of defence," is that your soldier, who is usually an optimist and a man of action, has an instinctive realization that it is easier to cover up lack of thoughtful planning in the attack than it is in the defence.

Britain is now on the defensive. Britons know that other nations less comfortably circumstanced are on the prowl. It is reasonable to assume that these other nations will first pick up unconsidered trifles here and there from weak owners, but British ownership is so extensive and her interests so world-wide that as the predatory Powers gain strength they will tend more and more to clash with Britain. When their leaders say to-day that they do not want to fight Britain, they may be believed—for to-day. Nevertheless, there remains an uncertainty with regard to to-morrow. The military problems of a defender nation, which is also a great possessor nation, present the utmost difficulty. Defence pure and simple is out of

the question. The ideal at which to aim is a combination of strategic defence with tactical attack and any staff college student will tell you that that is the most difficult form of the military art. The British have had more than one commander who excelled in this direction—Marlbrough, Wellington, and, most of all, Nelson. It is an ironic commentary on the lack of knowledge of many amateur strategists to-day that they would take it for granted that if Nelson were alive and in command of the British Air Force he would demand an overwhelming preponderance of bombers over fighters. It does not seem to have occurred to some people that if the "bomb-the-other-fellow" school of thought, as General Ashmore described it, had their way, we might see a British air fleet on its way eastwards across the North Sea meeting and *avoiding* a continental air fleet hurrying towards Britain on a similar mission. The average Briton is not of philosophic temperament and therefore he is unlikely to find much solace for the loss of wife and children in a bomb raid in the thought that a German or an Italian has suffered a similar bereavement.

It is assumed by many Britons that if or when this country engages in another war, Britain will immediately be heavily attacked in all directions by bombers. This thought was most noticeable in September 1938 and led to the dispersion over the western British landscape of more than 200,000 people. Nevertheless, a student of military strategy will understand that Germany's military objective in 1938 was Czecho-Slovakia and that interven-

tion by Britain would not have removed or changed this objective. The quarrel was with Czecho-Slovakia. That country offered reasonable military targets vulnerable from the air. The Czecho-Slovakian ground defences were not such as would be likely to make air attack very costly. Germany had sufficient bombers to make overwhelming attack on these targets. She could escort her bombers with fighters. Distances were short, navigation problems were simple, machines could be used for successive raids during a day, and damaged machines stood a good chance of getting back to a home base.

Was it likely then that Germany would give up this attractive military venture for the doubtful pleasure of bombing Britain? *And if Germany did not first bomb Britain, is it conceivable that Britain would have taken the initiative and bombed Germany?*

The Czecho-Slovakian episode is worth considering from a British air military point of view. Supposing the British Cabinet, having decided that it would not do for us to be the first to start bombing, had considered sending an expeditionary force of fighters to the Czecho-Slovakian front as Russia did for Republican Spain. It is suggested that this proposal would have been negatived on account of the anticipated reaction of British civilians at home, who had been continually told for many weeks by people occupying responsible positions in public life that Britain was dangerously short of fighters. It would have been fairly obvious to Britons that the sending of fighters to Czecho-Slovakia would not only invite German bombing

of this country as a reprisal, but also weaken our admittedly weak defence.

There remains one other proposal, and since it would have been a compromise it would probably have been to the British taste. We might have sent *bombers* to Czecho-Slovakia under orders to engage none but strictly military targets, the general nature of which we should indicate to the Germans beforehand. The objection to this proposal would probably have come from the British chief of air staff, who would have wanted to know what Czech bases were available and how long would they be likely to remain tenable; what workshop facilities there were; what arrangements could be made for supplies of munitions, fuel, and spares, and for reinforcement of personnel: and finally, was the Cabinet prepared to entrust the defence of British bombers to Czech fighters and would that nation be able and willing to detach fighters for the task?

Attention has been called to the Czecho-Slovakian episode because it offers an interesting and up-to-date example of the fact that military problems march in step with ever-changing political problems. An argument is about to be developed in this book having regard to present circumstances and the immediate future only. Nevertheless, the author believes that if reasons are given for suggested plans in connection with a given set of circumstances, similar reasoning may be applied to the changed circumstances which will undoubtedly succeed. In September 1938 there was no threat, either direct or

implied, of a German attack upon Britain. It is possible that the leader of Germany may have glanced significantly in the direction of his air fleet, but it is more than likely that the indicated *direction* of possible danger came from the *British* chief of air staff, who is not likely to have missed the hint given by the Germans when they proposed earlier in the year that an air convention should be signed, guaranteeing the immunity from air bombing of open cities and towns not containing targets of military value. The Germans are not notable humanitarians and therefore any German suggestion which smacks of humanity requires careful examination. Germany in 1938 greatly fancied the chances of her air force while fighting on the strategic defensive against western Powers. If she could by agreement secure reasonable immunity for her civilians living in open cities and towns, her air force would be free for tactical attack in two directions, namely, upon such bombers as her opponents sent against her and upon the valuable military targets in France and Britain which, in 1938, lay dangerously exposed.

What is meant by "targets of military value"? The author suggests that these targets are coast defences, garrisons and camps, aerodromes, arsenals, depots, naval ships and dockyards, and factories engaged in the manufacture or assembly of munitions of war. It is suggested that in attempting to limit air bombing except in these directions the Germans are slightly ahead of world opinion. If this suggestion is accepted it will be realized that in 1938 the Germans were more favourably placed

than either the British or the French, because already in Germany such targets as these were satisfactorily defended or defensible.

It is probable that if Germany had been forced into an attack upon Britain in 1938, she would not have attempted to bomb such places as Newcastle, Hull, Southampton, Bristol, and Liverpool, and that above all she would not have attempted to bomb London. In Germany it is now realized that to defeat your enemy it is necessary completely to subdue his armed forces while at the same time safeguarding as far as possible your own civilian population. This is opposed to the theory of totalitarian war which the Germans practised from 1915 to 1918.

In the light of recent history it seems at first rather absurd to suggest guaranteeing anything by means of a pact, but the Germans understand that the people who would see to the maintenance of a pact granting immunity to civilians not engaged in the manufacture or assembly of munitions of war would not be diplomats but the common people. The common people in the totalitarian states exercise their opinions in a different manner from those who live in democratically governed states, *but they exercise them*. A guarantee of limited civilian immunity is obviously more valuable to a nation which possesses a superiority of soldiers and warlike material, but a nation such as Britain could not conceivably refuse to be a party to such a pact *in practice*, however much British diplomats might have delayed or

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ignored its consideration beforehand. What may be described as the intrusion of the common people into regions of high diplomacy may be regretted in some quarters, but it cannot be ignored. It is not a matter of common knowledge in this country that when a committee of the League of Nations considered abolishing the bomber as a weapon of war it was Britain which inserted into its draft disarmament convention of 1933 a clause to except from the general abolition of bombing aeroplanes their use "for police purposes in certain outlying regions." The Germans began the bombing of civilians, but their example has been enthusiastically followed by the British ever since. If the Germans are now willing to cease from bombing civilians in certain limited directions, the British will have to follow suit.

A tactical reason for the suggestion that Germany would not in 1938 have bombed London and open ports and non-manufacturing towns has already been indicated. Plainly stated, it is that she could have found more useful targets, the attacking and destruction of which would have gone far towards assuring that defeat of an opponent's armed forces, which is the first aim of a military strategist. The city of London does not contain targets of military value, while on the other hand it *does* contain a large number of valuable hostages. The modern German strategist is concerned with two objects of equal importance: he wants to win the next war and he wants his diplomats to win the next peace.

It may be argued that if Germany does not intend to

bomb London, it would pay her to announce the fact, but to do so at this stage would be, from the German point of view, a serious blunder. At present the British consider that London is their most valuable and vulnerable target, therefore they have concentrated the bulk of their armament around that city and have made defence plans accordingly. German strategists are naturally pleased to see such a concentration of defence around a target they are not interested to attack, and will do all in their power to see that such defence is maintained.

The Germans learnt a lesson in the last war and have seen it confirmed recently in Spain. When they turned aside in the last war to make indiscriminate attack on civilians, they were making an experiment. On the whole the experiment was a complete failure and a colossal blunder, since it led indirectly to Germany losing the war. Such minor success as was achieved was more due to the novelty of the idea than its intrinsic military value, and the bloom of the novelty has now worn off.

Bombing civilians merely makes a military task harder. It unites the enemy and strengthens his will to resist. Bombing civilians is the quickest way of turning them into soldier material. Bombing civilians will never win a war and is absolutely certain to lose the peace that must follow. Specialists in military science have been aware of these facts for a long time, but unfortunately every science has its quacks and there is a tendency in human nature to consult the quack first.

This book is only concerned with politics in so far as

they affect or impinge upon air strategy. Mistakes are sometimes made in both arts, and the purpose of a book of this nature requires that more attention shall be paid to a stroke of bad business than to the nineteen good strokes which may have preceded it. Britain suffered a reverse in 1935 because of an implied threat against that portion of her military machine which has its bases around or in the Mediterranean basin. The British politicians who were in power at that time decided that as far as the facts of the circumstances were concerned, their lips should be sealed. When in 1938 Britain ran up against a similar implied threat against her military machine at home, the politicians who were in power tried to arouse British civilians by issuing gas masks and ordering the digging of trenches. The ruse failed, probably by reason of the fact that more or less exact knowledge of what is going on in the world is now widely dispersed. Solid British opinion was unmoved and the only effect was to call attention to the large numbers of people resident in Britain who do not conform to standard. Nevertheless, the handling of the affair in 1938 is more to be commended than the handling of a similar situation in 1935. Britons now know where they are, not only in the civil sense but also in the military sense. The influence on history will be profound. Contrary to the generally expressed opinion, a powerfully armed and defended Britain is not a factor for peace. Britons are the only people in Europe capable of going to war for no more serious reason than that they are angry.

The suggestion that the Germans do not intend to bomb open towns and ports will probably only be doubtfully received by those who feel that the German does not rate the life of a civilian, whether man, woman, or child, so high as that of a soldier. It is therefore emphasised that before modern Germany makes war she wants to feel very sure that she is going to win. She has now returned to what may be called military sanity, and understands that a war cannot be won until an opponent's armed forces are defeated. There will be nothing humanitarian in her sparing of civilians. It will merely be that, from her point of view, they are not dangerous while dormant and might easily become dangerous if roused.

It is the policy of modern Germany to divide her opponents and again to subdivide a single opponent. The German war aim, therefore, will be to segregate the enemy's fighting machine as far as possible and smash it with overwhelmingly superior force, while doing the least possible damage to his civilians.

Germany feels that she lost the last war on the home front owing to starvation. She is aware that, principally by her submarine action, she invited an intensive blockade by vastly superior opposing naval forces. She is determined not to offer the same excuse again. She does not want to make war for the sake of making war, but she is willing to fight for something she thinks she needs. She believes that her soldiers can win a war, using the air arm in strict subordination to the needs of the ground forces. She does not expect that another heaven-sent

potential opportunity to use her air arm alone, such as she was offered in 1938, will come her way again. She understands that "targets of military value" in Britain and France are now defended or in process of being defended or made defensible. It is now probably safe to say that under no future circumstances will a war between first-class Powers be decided by the respective air arms alone, *and from a military point of view this is unfortunate for Britain*. Aggressor nations are strong in man-power and will find some use for their armies in war. The extent of ownership by the possessor nations offers many opportunities to a determined and intelligent enemy. The foreigner is not so impressed by the strength of Britain in factory, arsenal, air base, and depot as Britons would like him to be. "One volunteer," says the foreigner, "*may be the equal of three pressed men, but he is not the equal of ten pressed men. Furthermore, the national spirit of self-sacrifice and courage which inspires their volunteers is by no means absent in our pressed men.*"*

The thought may be an unpleasant one, but the measure of the strength of Britain is not gold, steel, and concrete but man-power, and the quality of this strength is not to be gauged by competence in the performance of Swedish exercises but by willingness to die, if need be, for king and country.

* Since this book reached the printers, Britain has decided upon a certain measure of "near-conscription." The author is very disappointed. He considers that a wonderful opportunity to put the British rank and file "on-side" has been missed. He considers that *attraction* is far better than *compulsion*, however weakly the latter may be applied.

A reader taking this book at the gallop may become aware of what will seem to him to be inconsistencies, yet there are no inconsistencies. Scientific warfare begins long before the opening of hostilities. It may be likened to a game of chess, the opening of hostilities corresponding with the first capture or loss of a piece. Because a piece on the chess board stands threatened, it does not mean that it will necessarily be taken, either next move or ever. But it *does* mean that the piece is required to be supported, or that a similar threat must be made against an equally unsupported piece belonging to the opponent.

In the opinion of the author the purely civilian populations of civilized nations will in the course of time come to be regarded as the "king" on a chess board. That is to say, they will not be susceptible of being captured (destroyed). Modern German strategists are already of this opinion. [They feel that indiscriminate slaughter of the civilians belonging to a powerful and virile civilized nation is not likely to achieve the object desired, but rather the contrary. But the national spirit of the nation concerned must be A1. If it is C3, the Germans believe that air terrorism and a measure of air destruction *will* achieve the desired end. During the next few months aggressive German military policy is likely to go backwards and forwards according as Britain and France are categorized, as far as national spirit is concerned, either as A1 or C3, or somewhere in between. So long as their opponents can be intimidated, or are willing to

frighten themselves, those directing the aggressor nations will continue to wave the same stick or point significantly to the same weapon. It is worth remembering that a weapon which is displayed and flourished is not always used. A man may threaten another with a knife without at the moment having any intention of actually using that instrument. Nevertheless, the other had better beware. If he remains or becomes impudent, and indicates that he does not believe in the threat, and if there is no other implement handy, the angry man may, in a sudden access of temper, attempt to use the knife after all. The correct reply is *not* to seize and attempt to use a similar knife, but to take measures for protection and also for disarming the angry one.

It may be asked, "What then of the extensive terroristic bombing of civilians in Abyssinia, China, and Spain?" The national spirit of the populations which have been bombed in these three theatres of war has been anything but A1. There has been no national cohesion worthy of the description either in Abyssinia or China, and the fact that the Spanish war was a civil war speaks for itself. Neither in Abyssinia or China were there those necessary ancillaries or supports in the shape of refuge, repair, replenishment, or organized encouragement. A nation at war needs physical and moral rallying points which have been, practically speaking, non-existent in Abyssinia and China. Nevertheless, the aggressor in the Chinese war has taken a grave risk. He may win the war but by his terroristic air bombing he has greatly jeopardized his

chances of winning the peace which must follow. It is to be feared that the Japanese are yet barbarian at heart. If so, they carry within themselves the seeds of destruction, but it must be admitted that the process has been very unpleasant for some of the Chinese. Nevertheless, European onlookers get a very distorted view of the Chinese war. Far fewer Chinese, in proportion to the total population, have been killed by Japanese bombs than the proportion of English men, women, and children who are killed on the roads in this country each year.

The case of Spain is different, and provides a moral. Although Spanish national spirit was in a bad enough way to permit civil war, yet the Spaniards are a brave, virile, and civilized nation. Therefore according to the theory propounded by the author the bombing of civilians not engaged in the manufacture or assembly of munitions of war should have been a mistake for both sides to avoid at all costs. Allowing for the fact that the Nationalists had allies who wanted to make experiments, and making allowances for the bitter hatred engendered in a civil war, it is remarkable how, in the main, both sides *did* avoid this mistake. It is a great pity that the British have not, on the whole, been kept well or accurately informed concerning the progress of the Spanish war. Perhaps a good many of us did not want to be accurately informed. Although a well-built town was blotted out in an afternoon, the obvious lesson that cities such as Barcelona and Madrid could have been similarly blotted out within, at most, a fortnight does not seem

to have made any impression. It is obvious that the power was there. It is equally obvious that there was not the will to use it. The extent of the bombing that Barcelona and Madrid suffered was so little that within twelve months it is probable that few scars will remain. The number of Spaniards killed by air bombing is not only a small fraction of the total number killed in the war, but is even a small fraction of the number executed in cold blood.

It may be asked, "Why, then, were cities bombed at all?" The author suggests that there are several answers. In the heat of a bitter family quarrel there will always be hasty actions. Perhaps also it was required that a thing should be practised before people could be convinced of its uselessness. The Spaniards had allies who wished to make experiments. Probably over 80 per cent of the bombing in the Spanish war was nevertheless of a perfectly correct military nature. Most valuable practice led to most valuable results. It is no use screaming because the Germans and the Italians have used the Spanish war as a trial ground. Civilization, while grieving with and for Spain, may thank its lucky stars that the courage and spirit of the Spaniards proved, if proof were needed, that the senseless mass murdering of civilians by air bombing is not only a useless military manœuvre but has powerful negative results. If the Nationalists had not permitted civilian bombing they would have won the war earlier, and they would not (as they have) jeopardized the subsequent peace.

*Britain is attempting to hold
too much*

2. EMPIRE COMMITMENTS

From a military point of view it is obvious that Britain is attempting to hold far too much, but from a political point of view it is difficult to know where to begin with liquidating some of our liabilities. The author suggests in the first place that the Committee of Imperial Defence should have the last word in the matter, and in the second place he suggests that the example of a wealthy individual who finds that the burden of his possessions is beginning to interfere with his pleasure in living, might be followed. That is to say, trusts might be formed. It would be desirable to appoint selected foreign nations as trustees, as well as the self-governing Dominions. If fees for trusteeship were drawn from that which was being administered, everybody concerned would be directly interested in the maintenance of the estate.

It is sometimes forgotten that in the last war the British air forces worked behind a screen of very powerful land and sea forces. No useful purpose could be served by completely withdrawing the curtain from in front of the scenes of British imperial defence, but some readers will recall the difficulties which confronted the British war staffs in the Mediterranean in 1935. If every able-bodied man in Britain was put into the Air Force, yet

that force could not maintain the Empire against a determined first-class Power. The air arm is an offensive weapon. Its most valuable feature is its self-contained mobility, but it suffers under three handicaps. It can be immobilized for any useful military purpose by bad weather. Its machines can only be maintained in the air for short spells owing to fuel requirements. It can only carry small loads and hence it is dependent on land and sea services for its maintenance and replenishment.

As far as Britain is concerned to-day (1939) the British Navy is in a position to give co-operation equal in every respect to that afforded in the last war. On land, the position is entirely different. Britain can count on nothing in the shape of soldiers except those she can provide for herself. The author is francophil in the extreme, yet he asserts most strongly that those who think they can count on the French Army to assist in the maintenance of the British Empire are being fair neither to Britons or Frenchmen. Probably it will happen that if we fight Germany, France will come to our assistance, but in order to be absolutely sure we should require now to take the French altogether into partnership with ourselves and allow them a say in the directing of all our foreign policies and businesses. When failure in any direction must be paid for in blood and lives, those who must pay will have required beforehand that they shall have helped to direct. If we cannot conscript Englishmen, it is quite certain that we cannot conscript Frenchmen.

The British Army to-day is no more than it was in

1914; that is to say, it is a highly-trained and reasonably well-equipped nucleus force whose exercising is severely curtailed by the fact that the force is dispersed all over the Empire on military police duties. Therefore, although the Navy might successfully keep open the lines of sea communication, there does not exist at present a sufficient force with which to defend our bases in the Dominions and colonies. Britain is badly placed with regard to Empire air defence. The lines of air communication are yet (1939) too long to permit the use of Britain as a base for air operations in defence of the Empire. The advantages of "de-centralization" are obvious. The problems do not concern material so much as man-power. The apparent impossibility of British Empire defence has led some people to argue that the only thing we can do if the Empire is attacked piecemeal, will be to air-bomb the aggressor at home. This is a most stupid suggestion, for it means that Britain would take the initiative in a war directed against civilians. Even if the British were willing to permit this, they would range against themselves the whole force of world opinion, and if a nation such as the German cannot afford to neglect world public opinion it is much more certain that the British cannot. Whether we like it or not, we must dance to the tune called by an aggressor. If he decides to use his air arm only against military targets, then we shall have to do the same. Britain has gone too far along the road to civilization to give a lead in the direction of a relapse to barbarism.

As far as warfare between civilized nations is concerned, the air bombing of civilians as such is a phase whose usefulness, if it ever existed, has probably already passed. In the future the air weapon may become, as it certainly is not to-day, an instrument of precision. When that time comes the danger to civilians will be yet further decreased. We are not living in the days of Attila or even in the days of the reivers of the Scottish Border. A modern aggressor wants something more than cattle, sheep, and women. He wants the means to acquire a superior standard of living, that intangible commodity which exists in unequal quantities throughout the fabric of civilization. Civilians are bound up with civilization and no satisfactory purpose can be achieved by wrecking the fabric. The object of a modern aggressor will be to achieve power over those who are fortunate in ownership: in the furtherance of his designs he will not wish to kill and he may not even wish entirely to dispossess. Those who can survey the policy of modern Germany without suffering from excessive blood-pressure might do worse than study the methods Germany is employing in Austria and Czecho-Slovakia. So long as those who live in defender countries can be frightened, out-of-date methods and machinery of forceful persuasion will be much in evidence on the side of the aggressors and, although agreeing that we may not use a barbarian weapon ourselves and that our opponent is not likely to do so, yet we must have something ready with which to defend ourselves against such a weapon in case it comes to be used.

If Britain uses her great wealth and abundant material skilfully during the next few years, she may yet tide over a period of strained international relationships. It will suit British genius admirably to stand on the strategic-defensive, for though victory in *tactics* tends to run with the possessor of the initiative, yet in *strategy* there is much to be gained by letting your opponent make the first move.

Where a bomber can fly, there
can a fighter fly also

3. THE BOMBER WILL NOT ALWAYS GET THROUGH

Because there *does* exist a possibility that an aggressor nation might be tempted to turn a threat or feint into a real attack if it was thought that a defender nation was presuming too far, and because there also exists the possibility that a nation, having embarked on a war with the British Empire which she found herself losing, might be tempted to go nationally berserk and take Britons down with her into the abyss; it is suggested that Britain should neglect no expedient for safeguarding civilians in cities and towns by a satisfactory provision of guns, searchlights, sound locators, and any other form of limited defence with a sting in it which can be invented, manufactured, paid for, and manned. Limited defence with a sting in it means something with which an enemy may be attacked if he comes near enough. Therefore it does not mean dug-outs, shelters, and all the rest of the paraphernalia of Air Raids Precautions, neither does it mean balloon barrages. The "defence" provided by A.R.P. may be likened to a boxer holding up an arm in front of his face. This might make it more difficult for an opponent to land a knock-out blow but it would not prevent that possibility.

The author does not understand the meaning of the term "passive defence." He feels that the description implies a contradiction in terms. Unless some means of throwing dug-outs and shelters at an enemy is devised, then the author objects to their being described as "defence." He prefers the description "refuge." Neither is the author satisfied that balloon barrages are a defence. The peace-time confidence with which they may inspire the civilian population is not worth putting in the scales against the disgust which would be aroused after they had proved their futility in war. The author suggests that failing some new invention, it is not necessary to go beyond fighters, guns, searchlights, and sound locators. He is of opinion that Britain cannot afford the manpower for what seem to him to be merely the frills of defence. In a later chapter called "Aids In Defence" there will be found a full argument concerning balloon barrages, and A.R.P. also has a chapter on its own. Manpower is the key to the problem. An aggressor nation which is determined to get what it wants or perish in the attempt will submit to what amounts to wartime mobilization and wartime conditions of living *while yet at peace*, in order to be ready and able to prosecute a war with vigour. To expect the same kind of thing from a defender possessor nation is not reasonable, for it would involve the giving up of that comfortable state of living which is the sign and token of ownership. The defender has certain advantages—wealth, material, friends, and allies who probably will not fight for him but are willing to do any-

thing in reason and on terms—but he cannot hope to mobilize his men and women in the same way and to the same extent that an aggressor can. Nevertheless the skilled and experienced leaders of a great country which has enjoyed democratic government for many years, will not require to be instructed in the art of indirect compulsion. If, for instance, those who are willing and fit to serve in the fighting forces are offered some such personal gift of land ownership within the Empire as was done in the case of legionaries of the old Roman Empire, then it would be quite possible to raise the armed strength of Britain to a respectable and satisfactory figure. This method implies responsible citizenship, and is much to be preferred to the raising of what are little more than mercenaries by methods which are both equivocal and dubious as to result.

The arrangements made by a defender nation should be on quite a different footing to those made by an aggressor. Where one encourages its men with hopes of loot, the other should encourage its men by opening the gates of ownership. The defence should not be imitative. It *cannot* be imitative with man-power unless it pretends, and pretence of this kind is very dangerous. A possessor nation occupies an enormous area, and does not know exactly where or when the enemy will attack. One of the few advantages possessed by a defender is that limited defence with a sting in it makes greater demands on material than on man-power. Yet because it *is* limited, it must be most carefully placed. In spite of the fact that

Britain may be said to have lost a round in 1938 because her military targets were hopelessly exposed and undefended, we should nevertheless take care that civilian centres of population are more heavily defended than military targets. Although the king cannot be taken at chess, yet he is meticulously guarded. It is essential that the sense of proportion be maintained. If we protect our targets of military value so thoroughly that they become for all practical purposes invulnerable, then there is the risk that an opponent, driven desperate by need or exasperation, might shut his eyes to the lessons which have been taught since 1915, and once more commit the terrible military blunder of making war on civilians. An opponent should, for instance, be permitted to find it more tempting to attack Portsmouth than Southampton. The military machine of a defender nation, regarded as a whole, is the shield of the nation's population just as the air arm is (or should be) the same nation's spear point. The *raison d'être* of a shield is to receive blows. The personnel which composes the military machine of a defender nation should be reminded continually that it is being paid to protect civilians from all the dangers of warfare. The essential difference between the correct function of a defender's military machine and that of an aggressor, is not properly appreciated in Britain to-day. A very dignified retired Air Force officer is the principal mouthpiece of the "bomb the other fellow" school of thought. He likens the air arm of his own defender nation to the forwards on a football field who are not concerned for

the safety of their own goal, but who are intent on scoring goals themselves. Obviously he would be an exceedingly stout fellow to be in charge if Britain were an aggressor nation, *but she is not*. It is worth remembering that it was not only the Parliamentary infantry in our own civil war of 1645-49 who won battles, but Prince Rupert and the royalist cavalry who lost them. The case of two opposing bombing formations meeting and avoiding each other over the North Sea has already been cited. We do not want to see the science and practice of war reduced to the level that it once reached in China, when armed men carefully avoided each other and practised their profession only at the expense of civilians.

Pitfalls for the unwary abound in the field of military strategy. Someone once said to the author, "When you argue that the military machine of a defender nation is there to 'take the knocks,' and therefore should be less heavily defended than military objectives occupied or surrounded by civilians, you omit consideration of the fact that the business of the services is to defeat the enemy and they cannot both do this and be used as a sort of bait to draw enemy bombing away from civilians." Now that is exactly what the military forces of a defender nation can do and should do. Furthermore, if the baited trap is successful in drawing the marauder, the most fervent prayers of a competent air-military strategist in charge on the defending side, will have been answered. Even the animals and birds practice a similar manœuvre when they have a young family in danger. Once more it is a matter of

one form of strategy for an attacker, and another form of strategy for a defender. The nightmare of an air-military commander in a defender country is that he will not be able to find the enemy, just as a similar nightmare plagued Lord Nelson. *Of course* the job is to defeat the enemy, but only if and when he attacks. A small, wealthy possessor nation like the British cannot afford to go in for knight-errantry. The job for her military machine is not so much that of a police detective as a night watchman. Those who live in a country determined only on defence must resign themselves with the best possible grace to the fact that they have given up the strategic offensive. Belief in the doctrine that we have both the right and the power to attack in anticipation of attack, implies belief in British world domination. As a military man, the author informs his civilian friends flatly that we cannot hope to dominate the world, and in his own civilian capacity he begs to make the suggestion that life would become very uncomfortable for us if we did so.

Before making suggestions concerning the methods of dealing with an air bombing menace, it may be advisable to clear some ground. There is nothing so difficult to combat as a half-truth, particularly if it is stated sensationally. When a well-meaning British politician was primed by his air advisers to say that "the bomber will always get through," he was stating a particularly dangerous form of half-truth, because it lent comfort and support to certain dubious schools of thought and is involving Britain to-day, not only in faulty strategical planning, but

also in great and unnecessary expense. The policy of equipping Britain with a great fleet of strategic bombers has already benefited our trade rivals, and will benefit them yet more. It is tragic to see our foreign trade diminishing by the withdrawal of British capital and British labour from fields of commercial enterprise into the barren field of bomber production.

A fighting service is an excellent breeding ground for schools of thought. Active-minded members searching for something wherewith to occupy their minds, embrace eagerly a view towards which they are drawn and fortify it with enthusiastic vigour. Inactive-minded members are only too pleased to find a school of thought to which they can adhere without making any mental effort. The wish is so often father to the thought. After the last war the British Air Force, very junior, found itself delicately placed between two senior Services on the one hand and an apathetic, not to say suspicious, public on the other. The new Force was concerned to justify its existence. It proceeded to set its house in order, and self-sacrificing zeal for the Service and all it might do for the nation became the rule of the day. Fortunately, there was an Empire which required policing. The Air Force "jumped to it" and seized an opportunity in India while the Army was nodding. Further opportunities came in North Africa, Aden, and Palestine, and the Force did a good job of work in all four theatres.

Against whom did it operate? There was no opposing air force. There was no opposing navy. There was no

opposing regular army. Therefore it operated against irregulars, armed civilians, *and civilians out of arms*. In these days it had only one type of machine which could be used for machine-gunning people on the ground, and this type was ancient and had seen war service since 1916. It was neither suitable nor sufficiently reliable for organized "ground-strafeing," and in any case there were not enough machines available for this work. Therefore the Force fell back on the bomber, a machine which could not only carry a considerable lethal load, but which could dispose of it from a safe height. This type of machine was affectionately regarded in the Force for other reasons: it could, when the occasion required, as at Kabul, carry personnel usefully.

In the course of operations on the Indian Frontier it was discovered that although the fighting men of the tribes, while out on a military expedition, could not be satisfactorily attacked by bombers, yet their friends and relatives left behind in the villages could be seriously incommoded. The enemy was attacked on an unguarded front, and hill campaigns such as had previously occupied many months in the waging, came to be settled in a few weeks. The bomber became a most useful weapon in the hands of those directing our Empire police work.

It is worth observing how a school of thought is built up. The British Air Force found the bomber very convenient. It helped to afford justification for its existence as a separate force, and in its uses it pleased the Powers That Were. It was simple to operate, comparatively safe

in use, and achieved a highly satisfactory end. Good old bomber!

Parliament and the taxpayer having decided that machine equipment for the fighting services should be severely limited, the technical chiefs responsible for equipping the Air Force concentrated on a useful general purpose type. This type became, when required, a "medium" or "day" bomber. Backing it up was that extraordinary museum piece, the 1920-30 decade "night bomber." Both craft were easy to build and maintain, easy to fly, and capable of use from rough and constricted landing grounds. They had a poor range, but what did that matter? The Empire afforded plenty of room for aerodromes and landing grounds, and even a short range aeroplane made good much more debatable territory than could the Army. Their speed was comic, but far outstripped that of the irregular cavalry and infantry with which alone they were matched. Because the Englishman is at heart either a craftsman or a warrior, the *ne plus ultra* in either type was finally evolved, and a touch of genius in the race assured that, in addition to day and night bombers, there should be evolved a type of fighter-bomber which is likely to prove as satisfactory to the British Air Force as was the Dreadnought to the British Navy. This type may one day play a major role in a war in defence of the British Empire.

After a short time, if you think as an historian—after many years, if you think otherwise—it became evident to most people except the majority of leading British

politicians, that war as an interesting possibility between civilized nations, was once more on the carpet. In the meantime, primarily as an exercise to test training efficiency, the British Air Force had invented a scheme of annual manœuvres designed to test the defences of Britain against air attack. Granted that there *were no defences*, the exercises served their purpose quite satisfactorily. Staff and operative commanders gathered much useful information. Then the politicians, at last awakening to a threat of war, required at short notice a scheme of defence against air aggression. The Air Force offered its annual manœuvres scheme while at the same time pointing out that it was not much use. The politicians, instead of returning the scheme with instructions that if it was not much use it had better be amended, *and quickly*, accepted the scheme on its face value and at the same time endeavoured to cover themselves against hostile criticism by putting up various people, including retired Air Force officers, to give variations on the theme "the bomber will always get through." The answer to this unpleasant thought was provided by putting up other people to give variations on the theme, "war is unthinkable." The sequence is interesting. A thing is: It is unpleasant: Therefore it is not.

By playing into the hands of conservative-minded Air Force officers, the politicians also played into the hands of those senior Air Force officers who regard the bomber as the darling of their hearts. The bomber had "kept" the British Air Force during lean and tender growing

years. British aircraft manufacturers knew how to build bombers suitable for empire police work, therefore surely with a little improvement, types could be made suitable for carrying our reprisal bombing against a European opponent! Possibly there was an underlying unvoiced thought, "If we tackle bombers successfully, are we not going to torpedo our own ship?" If such a thought was present, it was unnecessary, for the bomber will play a big part in the waging of the next war, *but in directions that only the military mind can appreciate.*

The admission on behalf of a first-class air Power that "the bomber will always get through," is an admission of incompetence. Even in the last war, the cause of the cessation of enemy air raids on Britain was not reprisal bombing, but suitable action by fighters working in close co-operation with searchlight units. (The last air raid on Britain took place before the British Independent Air Force went into action.) Because the lay mind has been educated to believe that "the bomber will always get through," Britain is being invited to spend huge sums on bombing armament; and because bombers cannot be built in Britain sufficiently quickly to meet what is supposed to be an urgent need, many bombers are being ordered to be built abroad. Because the British lay mind has been educated to believe that "the bomber will always get through," there was afforded some excuse for the disgraceful exhibition of September 1938, when over two hundred thousand people from the south-east and the Midlands fled to the west in panic.

In some quarters it seems to be the opinion that failure to keep enemy bombers out can be successfully covered up by bombing him in return. Apart from the political stupidity and the implied confession of air-military incompetence involved, it is suggested that if such a policy ever comes to be carried out, Britain is in for a very unpleasant military experience. It is not the opinion in responsible quarters in the aggressor countries that it is impossible to keep bombers out. In the Italian and German Air Forces, opinion is the other way about; and the attitude of Britain is not understood. It is suggested in both quarters that *Britain wants an excuse to bomb civilians.*

Most of the "informed" propaganda in Britain for a bombing reprisals policy has the backing of retired Air Force officers. It seems probable that while these officers were yet serving they belonged to the "reprisals" school of thought. It seems a pity that such officers cannot be persuaded to think more in terms of to-morrow, and less in terms of yesterday. If they *must* be influenced by ancient opinion and ancient history, why do they pay no attention to the way the British stopped the German air offensive on Britain in the last war?

Misunderstanding between nations there will always be, but it is unnecessary that misunderstandings should be increased by "experts" who do not know their job. The modern school of service thought in Britain which prefers to think in terms of the changed conditions of to-day and the way these conditions are likely to affect things

tomorrow has a sufficiently hard task to convince Conservative elements in the Services, the politicians, and the common people, without in addition finding the retired experts ranged against them. The recently announced intention to build five thousand fighters is the result of many months of hard and patient arguing. It should not have required a Service Press campaign extending over many months to inspire changes in policy and equipment in the British Air Force.

The question of how to tackle the bomber has got to be faced. To listen to those who speak in support of counter-bombing action, it might be imagined that the flying and operating of a bomber in attack is likely to be simple and comparatively safe. It is not, as both the Italians and the Germans know well. The author of this book has flown both fighters and bombers in war and in peace. If given his choice in a war to-day, he would unhesitatingly plump for the fighter. It seems to be forgotten that British fighter pilots in the last war had little difficulty in finding their opponents. Also, although it frequently happened that the enemy machines were as fast as the British fighters, yet somehow or other it was found possible to bring them to engagement. The British fighter pilots were handling fragile machines, and were not equipped with parachutes. They did not sit behind the shelter of a great engine. Often they had only one gun. Yet they not only made their own air reasonably secure against the enemy, but for certain seasons they made his own air dangerous to him. This argument is based on

what happened in France and in the East, and not on what happened on the home front. The way the German air raider was allowed to do as he pleased on the British home front for many months was a disgrace to the defence concerned. When finally public opinion demanded something more satisfactory, suitable measures were provided and the German raids ceased. In the next war there will not be time to wait for orders expressed by public opinion. If the British Air Force, which has now been in existence for over twenty years, cannot devise a scheme for satisfactorily dealing with enemy bombers attacking the home front, and see that it is supplied with the right kind of material with which to put this scheme into operation, then it is high time that changes were made.

When the statement, "the bomber will always get through," was first made by a responsible politician in Britain, the necessary evidence was being supplied by British bombers of the type "night bomber, 1920-30 period." It is quite safe to say that 1918 vintage war pilots, flying 1918 type fighters and led by 1918 type fighter squadron commanders, could and would, in 1933, have caused such destruction to a bomber fleet consisting of Virginias, Hinaidis, and Heyfords, that less than half of an air fleet so composed would have escaped. Now there are Blenheims and Whitleys, but also there are Spitfires and Hurricanes. If a Hurricane pilot cannot shoot down a bomber such as a Blenheim, then he should bomb it; if he cannot bomb it, then he should ram it. If

it comes to the last resort, the protection afforded by the engine, and the use of a parachute, will probably save the fighter pilot's life anyway.

The chief argument advanced by those who seek to decry the ability of a fighter defence to deal with a bomber attack is that the fighter pilot may not get to engagement point in time to attack the bomber, or that he will not be able to find the bomber. The answer is that if that is the case, then there is either something wrong with the plans or something wrong with the machines, or both. *For where a bomber can fly, there can a fighter fly also.* And if the pilot of a bomber can see to bomb, then the pilot of a fighter can see the bomber. If the bomber cannot see to bomb, then the situation contains little or no military danger, for no nation in which remains any vestige of courage and virility is going to surrender in response to scattered indiscriminate bombing from behind the cover of clouds.

It is true that the single occupant of a fighter is at a disadvantage when it comes to finding enemy bombers, owing to the fact that he has only got one pair of eyes, is probably wearing goggles and an oxygen mask, and is sitting within a streamlined built-up fuselage. The last-named handicap can be dealt with by satisfactory design. As for the other handicaps, fighters will, while searching for an enemy, be flying in formation and consequently each pilot need only be responsible for keeping a lookout in a restricted direction. In addition, the duty of spotting and keeping touch with enemy bombers should

devolve on reconnaissance air cruisers not concerned with fighting at all, and such cruisers would naturally be able to communicate their news to the fighters.

It is also true that an enemy may choose to navigate within cloud, and emerge therefrom for a short time only in order to identify a target and drop his bombs. This presupposes a satisfactory continuance of adequate cloud cover. It also means that the enemy would have to emerge on the lower side of the cloud cover. Not only would he become immediately vulnerable to attack from defender fighters, but the defending A.A. guns, having the exact height of the cloud lower level, would stand a fair chance of making a direct hit with their first salvo.

It is suggested that plans are important, and choice of material is important, but that a yet more important factor is liable to be overlooked. Some time ago the author of this book was being shown round a famous fighter squadron by its commander, who proudly displayed the latest thing in machines. We spoke of this and that, and eventually the squadron leader began to talk dolefully. The reply given to him was as follows:

“Anyway you have this satisfaction. You will be fighting over your own country, with your own admiring populace below, and a lovely comfortable hospital and pretty nurses all ready waiting for you. Think, on the other hand, what the enemy bomber pilots will be feeling: probably wondering whether, if they are brought down, they won't be lynched as babykillers!”

This elicited the following reply:

"That is not much satisfaction if you are going to have your leg or your arm shot off, or a nasty hole made in your stomach."

Now it is suggested that that is bad. The squadron leader concerned is a good officer, but he obviously should not be in command of a British fighter squadron. The author does not suggest that this view is typical in Royal Air Force fighter squadrons, but it is not a good sign that such a view is expressed at all. Our fighter squadrons should be manned by fire-eaters and should be commanded by men who are not so much "brave" as utterly fearless. Here is a different story. At Lahana, in the Salonika theatre of the last war, there was once stationed No. 17 (Fighter) Squadron. Most of their machines were "unairworthy" by modern standards. At Drama, in the Struma Valley, the Turks, under German supervision, laboriously excavated hangars in the hillside which were to be immune from air machine gunning and from air bombing. Word came to No. 17 Squadron that bombers were being erected in these hangars. "A" Flight (SE5s and Camels) took off from Lahana, landed on the Turkish aerodrome, taxied to the entrance to the hangars and emptied their machine-gun belts within. Lest this small feat of arms be underrated, the following facts may be recalled:

1. The Drama aerodrome was a rough wartime landing ground, and the S.E.5 had a delicate under-

carriage—so delicate that even a good pilot of to-day would probably break an S.E.5 under-carriage if attempting a landing on a strange rough aerodrome.

2. The Camel had a rotary engine, very easy to choke on the take off if a pilot was excited or hurried.
3. The Turk was notoriously a bad prison master.

On the occasion in question, as so frequently happens, courage was rewarded. All of No. 17's machines returned safely to Lahana. The raid was successful, for the Turk lost heart and bombers were never flown from Drama.

The machine is important, but the spirit of the man behind it is yet more important.

The bomber will *not* always get through.

The small ships defeated the great ships. It is a lesson worth remembering

4. BOMBER FORS AND AGAINSTS

In the last chapter the author was critical both of bombers and, by inference, of the annual manœuvres designed to test the air defences of Britain. Before making comments concerning the latter, it is necessary to clarify the position regarding bombers, lest a reader should form the opinion that the author despises the bomber as a military weapon, whereas the contrary is the case.

A remarkable instance of the value of the bomber occurred towards the end of the Palestine operations in the last war, when a Turkish division in retreat was caught in a narrow defile and practically annihilated. The defile became choked with dead bodies and military impedimenta. Another instance occurred in Spain early in 1937 when at Guadalajara about one hundred and twenty Republican bombers and fighters attacked the first and second Nationalist Army motorized divisions on the line of march. Insufficiently deployed on account of the few available roads, the two divisions were thrown into great confusion and suffered heavy casualties.

The similarity between these actions will be appreciated. The air arm was being used for a military purpose. An axiom may be stated. The useful action of the air arm of a military machine diminishes progressively ac-

according to its operative distance. Except for the purpose of self-transportation, when the tare load of a machine may consist almost entirely of fuel, the only military need for heavy load carrying machines is for fortress bombing, ship bombing, or other similar purpose. The author does not approve of the long-range air transportation of bombers because he believes that the weather, enemy operations, and extravagant use of fuel will vitiate the possible usefulness of such manœuvres. He would prefer to see the Air Force operating from Empire air bases depending for security not upon the quality of self-contained mobility inherent in flying machines, but upon the Navy and Army. He believes that the useful depth behind a line of resistance on land to which it is worth penetrating is certainly not more than a hundred miles, and may be less. Any deeper penetration by the air arm, however successful it may appear to be at the moment, cannot be sufficiently quickly followed up. War between first-class Powers is a business of hammer and anvil. Both Navy and Army can stand and deliver blow after blow; an Air Force can only deliver blows as it flies. When it comes to the time for the employment of pincers, the air arm is comparatively useless.

If the author is right in his opinion, the correct form of bomber for a defender nation would be a handy machine which could be flown off small, rough landing grounds, and which could look after itself in the air. In the opinion of the author it would be bad strategy on the part of Britain to rely on reinforcing a far distant theatre

of war with machines capable of carrying a heavy load because these machines, by reason of their type requirements, might very well prove highly unsuitable for the immediate military requirement.

From the point of view of a defender nation, there are other important reasons for limiting the rôle and the numbers of heavy load carrying machines. To begin with, they cost more. Their cost in pounds, shillings, and pence *may* not be serious for a wealthy country, but these machines cost more in man-hours and man-power, both in their manufacture and their operation. Britain is already heavily outnumbered and should make the manufacturing and operative work of every British workman and fighting man tell to the last ounce. The next objection to the heavy load carrying machine from the British point of view is that it is an extravagant consumer of fuel and that this fuel must travel to Britain in particularly vulnerable vessels. After its arrival in this country the fuel must again be transported, and stored, and guarded—more man-power expense. The next objection is that this type requires a big, smooth aerodrome from which to operate. Such areas are not easily available within Britain and it so happens that some of our most valuable possessions abroad are equally badly served. It is not generally realized that many British aerodromes are not adequate for the use of the modern high-performance monoplane carrying a full war load. Because of the great difficulty and expense which would be involved in enlarging aerodromes, or removing them altogether to better sites,

some of the British bomber squadrons would be unable to take off from their own aerodromes with full war loads in wet weather.

It does not seem to be generally realized that the British air force operates under greater handicaps of weather and terrain than that of any other first-class Power. The extent to which Britain has become built up, the irregular contours, the network of roads, railways, overhead cables and wires, and above all the disastrous climate mingled with the smoke pall which overhangs so much of the country on so many days throughout the year, all combine to make flying operations very difficult and *the bigger the aeroplane the greater the difficulty*. In the olden days Spain, with an ocean at her doors, found it convenient to build great vessels while at the same time Britain, with narrow seas around her, found it convenient to build small ships. The small ships defeated the great ships. It is a lesson worth remembering.

It is quite impossible to guarantee that a bombing offensive shall be kept up, and this applies more and more as the distance increases. Everything else may be ready and the ideal date for attacking may have arrived—a date possibly which cannot be extended—yet bombers may be immobilized, unable to take off, or unable to proceed with a reasonable prospect of finding and engaging an indicated target.

Even when they are being skilfully and bravely handled, bombers are not yet weapons of precision. Altitude bombing in particular is very erratic and with every

advance in ground gunnery the bomber is being forced higher and higher. We cannot do without bombers, but that proper continuance of a military method of waging war which is so much to be desired by everybody will depend to some extent on the conduct of a nation's bomber personnel, in whom will be required a high quality of courage, skill, and *responsibility*. Targets of military value are already difficult to find and identify in some countries, and the chances are that they will become more so. Modern war plant is being so built that it will be necessary, if it is to be severely damaged, that it shall be hit not once but many times. The qualities of courage, skill, and training required from airmen if they are to ram home an attack at the centre of a target situated within the heart of an enemy country, are immense. Only that bomber personnel which happens to be in a nation's air force at the beginning of a war will be really highly skilled and practised: once these have become casualties the standard of performance will drop quickly.

What does all this lead to? The author suggests that on account of Britain's need to ration her use of man-power, the matter of the provision of bombers, and the type of bombers provided, should be the subject of the most exhaustive thinking and argument. He has already suggested that in building and buying millions of pounds worth of bombers Britain is playing into the hands of her opponents in the field of foreign trade, but this question of the proper use of man-power is even more

important. For every bomber that Britain builds or buys she could have at least two fighters. For each pair of bomber pilots that she trains she could have three fighter pilots and their training would take less time. Where she must store one bomber she could store two or three fighters. The fuel required to keep one bomber in the air for an hour would keep two fighters there for an hour. The expense of instruments, both in cash and man-hours, for one bomber would equip five fighters. The bomber requires other members of a crew besides pilot and gunner, and their training takes a long time. The cost in man-hours of building a bomber, maintaining it, teaching its crew to operate it, and finally operating it cannot be exactly computed against similar man-hours in the case of a fighter, but the author estimates that in this respect the bomber is at least three times as expensive.

What is the reason behind the proposal to equip Britain with an enormous fleet of bombers? The Italians and the Germans think that it is because we cannot defend our Empire, and that therefore we are preparing to bomb an opponent's civil targets at home. If one asks them, "How do you suppose we could justify such a course?" they reply, "You English do a thing first and justify it afterwards," The author refuses to believe that the Germans and Italians are right in their opinion in this matter. What is the opinion in England then? Many people in important positions both in the Air Force and out of it, are saying that bombers are wanted "for reprisal purposes," and when asked "Reprisals for

what?" they say, "For the bombing our defenceless civilians will get." It is hoped that already sufficient reasons have been given in this book for the belief that this fear of civilian bombing is imaginary. An enemy may make many mistakes in the next war, let us hope he will, but it is not likely that he will repeat the mistakes that were made in the last war. The modern German's dislikes of being starved, of being killed, of being disliked by everybody, are quite as keen as the modern Englishman's. Some of the Germans may be bloody-minded butchers but it is quite a mistake to think they are all like that. England also has its "Shoot them down, sir," brigade, and the brigade is not entirely composed of men. If Germany goes to war, it will be because she wants something and cannot get it any other way; and if she gets what she is after she will afterwards wish to enjoy it in peace. That cannot happen if she plays the hun. This is what is meant by "winning the peace."

Germany does not wish to give any nation an excuse to bomb her civilians. The rulers of Germany are of the opinion that there is little or no ground for quarrel between the German *people* and French *people*, or between the German *people* and the British *people*. They have already placed great reliance on this belief, and it has not failed them. The rulers of Germany feel that their nation is "non-possessor." They also feel that there are large majorities of individuals in France and Germany which are also "non-possessor" and they feel that between the German nation and these "non-possessor"

individuals in the possessor countries there is a secret bond of sympathy. The rulers of Germany are very anxious to see this supposed bond of sympathy maintained. They understand that the surest way of breaking it would be to bomb defenceless men, women, and children in France and Britain. It is unreasonable, however, to expect the rulers of Germany to do more than give a hint of their thoughts in this direction. For one thing it would not be well understood by Germans who have been taught to expect from their leaders a declared policy of blood and iron: for another, a complete unmasking of German aims and hopes would make the task of the German military strategists more difficult: for another, it suits German policy admirably to see Britain spending millions of pounds on unnecessary war material.

If a strategic reason for the buying and building of a huge air fleet of strategic bombers cannot be found, is there any other possible reason? Is it auto-suggestion from trade interests concerned? Since much of the money will go to Canada and America this seems hardly possible. Is it to please Lord Rothermere? Again this seems hardly possible. Is it in order to give British politicians the power to intervene in Europe? This seems nearer the mark, perhaps. It is obvious that if Britain owned not only the most powerful composite navy in the world but also the most powerful composite air force, our lack of troops would be to some extent masked, but the author suggests that the present regimes in Germany and Italy are difficult to bluff. It is more than probable that if either

Germany or Italy were ready for a colony-snatching adventure, or a trade war supported by arms, they would carry on with the enterprise using only such military means as conform to established civilized warlike custom, and tacitly defy us to bomb them at home. If this happened the author feels very sure that Britain would have to keep her "strategic bombers" at home and the people who would decide this would not be the British War Cabinet but the British people.

In the manufacture and purchase of material and machines, in the building of aerodromes, in the training of personnel, either the fighter need must come first or the bomber need must come first. May the author be allowed to repeat that it is not so much a question of money as of man-power and man-hours. Britain can command unlimited material, but so long as she is living on a peace-time basis and is dependent on the voluntary system for recruiting, she cannot command unlimited personnel. Were it not for the Empire, it is suggested that Britain, by changing her planned air strategy and tactics, could make the British Isles impregnable against air attack without resorting to any form of conscription. But the Empire stands and it seems to be the general opinion in the country that it shall stand. If we want to keep it, the politicians should now devise an attractive scheme of Empire ownership which would in itself solve all our recruiting problems and prevent the necessity for the very dubious policy of attempting to inculcate nationalism by propaganda.

If the defence fails to shoot down bombers before or during an attack, then the defence has suffered a reverse

5. CRAMPED DEFENCE

A remark concerning "planned air strategy and tactics" which occurs towards the end of the last chapter leads naturally to the other great point at argument between the author and those responsible for the air defence of Britain.

As a result of our unpleasant experience at home during the last war, the British settled down to design and build fighters with a tremendous climb performance. Our post-war answer to the war-time bomber was the interceptor fighter and it was a very satisfactory answer. Succeeding advances in the design and performance of bombers abroad were successfully countered by improvements in British interceptor fighting performance. But a day came when the graph no longer bore a satisfactory relation to the problem involved, namely, the defence of Britain against air attack. By 1935 it would have been necessary, if the graph was yet to have meaning, to move Britain further away from the continent of Europe. Therefore the old theory of the air defence of Britain by interceptor fighters broke down. What was the answer of those responsible? They decided that the description "interceptor" should be abolished. That, in effect, was

the sum total of their answer. They did not provide a new scheme of defence, but they proceeded to bolster up the old one by a series of improvisations and expedients, and they justified or attempted to justify their inaction by giving official backing to the statement "the bomber will always get through." The history of each air exercise designed to test the defences of the metropolitan area of Britain has been advanced in support of this pernicious theory. It is suggested by the author that since the speed of bombers became increased above 150 miles an hour, no serious attempt has been made to keep them out. Year after year during the annual and somewhat monotonous air exercise, bombers have left their aerodromes (usually somewhere in the home counties) and flown towards or over Greater London with varying tactical success. Ancient types of machines, all flying at little more than the speed of a modern express train, have satisfied the umpires concerning their ability to escape the attentions of both fighters and A.A. guns. Even when practical test conditions were removed from the exercise in order to afford simple practice for the Observer Corps, the air defence of Great Britain has had to admit failure to keep the bombers out. This implies no reflection on the tactical units in the Fighter Command. To ask these units to keep out bombers which were already in the air at operative heights within British coasts was equivalent to asking a boxer to keep his hands down by his side until the opponent's blow had been launched.

If the notice of attack was too short in the case of bombers flying at less than one hundred and fifty miles an hour, what is it likely to be in the case of bombers flying at 300 miles an hour? In 1938 it was actually asserted by a very highly placed officer in the Territorial Army that—

“The coast defence batteries, formed of medium, light, and heavy guns, perform the all-important function of defending our ports from enemy raids and possible invasion. To them, too, would fall the duty of giving the first alarm of enemy air squadrons crossing the coast line.”

It will be noticed that the officer concerned assigns a function to coast defence batteries, which is the only *raison d'être* of the Observer Corps. This is only one instance of complete lack of co-ordination between ground defence units and air defence units. Even the most obstinate person concerned with maintaining that the air defence of Great Britain is in as satisfactory a state as possible will scarcely claim that fighter squadrons can be usefully launched against enemy bombers concerning which the first alarm has been raised by a coast battery sentry.

A bomber which crosses a coast line at 250 miles per hour can be 40 miles inland ten minutes later. If communication arrangements are first class and if all personnel are standing by, it might be possible to get certain

fighter units off the ground within five minutes of the first sighting of enemy bombers by a trained and responsible observer. Yet consider the radius of action open to the bomber from the time he passes out of sight of the coast watcher. It is conceivable that succeeding observers inland might pick the enemy up, but additional observers mean additional communication, involving delay both in reception and in co-ordination by Fighter Command staff. Also each additional human link increases the chances of mistake and misunderstanding. It is probable that the most perfect results under present arrangements might permit of certain fighter squadrons reaching engagement point (not to be confused with engagement height), about twenty minutes after bombers had crossed the coast, always provided that Fighter Command staff had been clever in deciding what were the probable targets in danger of attack. Comparatively simple manœuvres by the commander of enemy bombers would enable many of his machines to reach the area of their objective, identify and select their targets, and drop their bombs, before a single shot had been fired against them by a defender fighter.

Yet the scheme of defence was once sound, and the author believes that it can again be made sound. In allowing itself to sustain attack which has passed the initiatory stages and developed within Britain, the air defence of Great Britain puts itself in the position of a gentleman running a pheasant shoot, who places his gunners more with regard to the offering of sporting

shots than with regard to the killing of the maximum number of birds. If he wanted to achieve the latter result, he would place his gunners in a semi-circle, within fifty yards of the end of the first cover from which he knew his beaters could flush birds. The inference is obvious. Enemy bombers should be engaged as near their rising point as possible. Unfortunately, owing to the fact that an aeroplane can only stay in the air for a limited period, it is impracticable to blockade aerodromes. The nearest point worth considering seems to be the enemy frontier. Here, like the pheasant in early rising, sluggish flight, the bomber will be flying under handicap. The weight of his fuel and bombs will be keeping him down and his load will lessen his tactical manoeuvrability.

The question of frontiers is likely to become of enormous importance. For centuries the strategic frontier of Britain has been carried at sea. Sometimes, as in 1666 and during most of the period 1914-18, we have seen fit to allow our seaborne frontier to dangle near our own coastline, and many people who do not understand warfare have asserted that, because of air power, Britain is no longer an island. This statement is as inaccurate in the military sense as it is in the physical sense. Nevertheless, because of air power, it has become necessary to extend Britain's strategic frontier overland, since the inconvenient continental re-entrant made by the Belgian and French coastline north of Boulogne deprives her fleet of essential manoeuvre room. The manoeuvre

room required by a fleet defending *not itself but Britain* is nowadays governed by the speed of bombing aircraft.

The senior British politician who affirmed, in one of those flashes of inspiration which have served to lighten an otherwise rather noticeable darkness, that the British frontier was now on the Rhine, spoke the half of a military truth, though one is inclined to believe that he was thinking politically. Allowing for the fluctuating factor of aeroplane performance, Britain's strategic frontier to-day may be taken as running from the entrance to the Baltic Sea, down the German, Dutch, and Belgian coastlines, and along the Franco-Belgian frontier as far as Sedan; and it is of vital importance to Britain that she maintain this frontier.

Time after time during the last war invaluable advance information regarding the enemy's onset and movements only reached British tactical formations too late to be of use. To-day information must percolate through yet more channels, so that with the best will in the world there will be at least as great a lag between information and operation, *and bombers fly three times as fast*. It is obvious that only some new form of defence very superior to anything available in 1914-18 can save Britain from the risk of very unpleasant experience in a future attack by air. In this connection it is ironical that the British Navy, which did not know how to use its air arm in the last war, should recently have succeeded in regaining control of that weapon while yet giving no evidence that

it now understands the potential use of the fleet-borne air arm in the defence of Britain.

Those who write and speak on behalf of the British Navy have asserted that battle fleets including aircraft carriers can now be successfully defended against both air and under-water attack. If British capital ships can indeed so maintain themselves at sea, then during the next war they will be required to do so, instead of lying in harbour in North Scotland. If this remark be considered unkind, attention is invited to the flight of the British fleet from Malta in 1935. The North Sea fleet should be required to maintain aircraft carriers and observation vessels at least one hundred and fifty miles east of the British east coast from Newcastle downwards where geographical circumstance permits, and where this requirement is impossible, as it is from the Hook of Holland to Dunkirk, the Navy should be required to strengthen the line and supplement it by air patrols. By such a disposition of a floating line of observation and defence, Britain would have gone far towards denying the overseas route to a continental raiding enemy. *The task in hand is not concerned with the security of the fleet so much as with the security of Britain.*

As has already been shown, heavily loaded bombers on their way to attack Britain will in the earlier stages of their enterprise be subject to a definite "ceiling" limit, that is to say, the maximum height obtainable by an aeroplane of a given type carrying a full war load. Since the performance of all aircraft is known abroad almost

as soon as it is known in the country of origin, the naval officer commanding air units aboard ships would have a much simpler task than the air officer commanding fighter defence within Britain. The depth of air room available to bombers increases continuously during any operation owing to loss in fuel weight and finally loss of lethal load. Bombers while heavily loaded would not only be "contained" under a reduced ceiling height, but would also only be sluggishly manœuvrable against Fleet Air Arm fighters.

If the British North Sea fleet can indeed keep the sea as is asserted, then the Fleet Air Arm borne aboard these ships can be trusted to make a passage by enemy bombers over the North Sea very expensive and uncertain in clear weather. The enemy would next be likely to utilize weather during which the upper air was clear although a blanket of cloud and mist hung between heaven and earth. But where an aggressor can fly, a defender can fly. When the principles of air strategy are better appreciated it will become an understood thing that whenever a cloud layer intervenes, the defenders must patrol above it with reconnaissance aircraft. Under certain circumstances favourable to the attack, such as considerable depth of cloud layer and nearness to target point, it will be necessary to supplement reconnaissance patrols with fighter patrols.

A year or two of practice by a North Sea fleet and Air Arm in all weathers would prove whether the air path above a cloud layer in daylight could be denied to

an enemy. By night, the fleet would have to rely on sound detectors and searchlight barrages at any point where the cloud layer was broken. When the cloud layer was unbroken and sound detectors indicated the approach or passage of enemy aircraft, the information would require to be signalled to Britain's Fighter Command which could then send up fighters to patrol both below the clouds and above them at any points where searchlights could assist.

There remains the possibility of an enemy navigating within the cover of clouds to a point above Britain. Until recently such navigation could only have been satisfactorily accomplished by the aid of a large number of satisfactorily disposed wireless directional stations, but the perfecting of the air sextant has simplified matters to such an extent that blind navigation has now become a perfectly reasonable strategic undertaking. Nevertheless, there is always the risk of a cloud layer running thin or even disappearing, and if we are to suppose that an enemy will be on the search for particular military targets, he will require to emerge on the lower side of any cloud cover in order to identify and attack such targets. The author does not approve of counting chickens before they are hatched, but it seems necessary to mention here an invention which is already at experimental stage, and that is the infra-red searchlight. It is suggested already that such a ray can be projected as far as 20,000 feet, and it has the enormous advantage, from the point of view of the defence, of being invisible. With such an "eye"

combined with good sound locator apparatus and plenty of ground guns, the air passage of a fleet of bombers flying within a cloud cover could be made unsupportable.

Advances in the accuracy with which artillery fire can be directed against aeroplanes have already compelled air staffs to make plans based on altitude flying and on cloud flying. Apart from any question of humanity or politics it is most unlikely that an enemy would be satisfied with dropping bombs from within the cover of clouds, for bombers so flying would necessarily be dispersed and the effect of a widely scattered bombing would not be sufficiently great to justify the enterprise. Yet if bombers drop below such a cloud layer in order to find targets, they must do so as single units and would fall an easy prey to patrolling defender fighters who would have been warned of their presence and informed concerning their course by sound recorders.

Continuous cloud layers are usually only to be found within a few thousand feet of the earth's surface and at these heights bombers, on emergence, would not only be exposed to early attack by defender fighters but would present a very satisfactory target to A.A. gunners who, informed by the defending fighters, would know the exact height of the cloud level.

Attention is called to a common factor in both of the preceding paragraphs—that of co-operation between the ground defence-attack and the air defence-attack. It is difficult to over-emphasize the importance of the inter-dependence of these two forms of attack.

A function for the British Navy has been briefly indicated, but it is emphasized that it is based entirely on the claims of Navy protagonists with regard to sea-keeping: if these claims cannot be substantiated, then the way of approach over the North Sea must be guarded by the British air force in the same way as the continental land re-entrant which runs from the Hook of Holland to the mouth of the River Somme. This salient represents the Achilles heel in any scheme for the air defence of Britain. It is most unfortunate for Britain that Belgium has seen fit to withdraw from the Franco-British alliance, but the move was obviously a wise one on the part of Belgium. In 1914 Germany took a high hand with small Powers but, with the exception of upper air intrusion, it is extremely unlikely that this example will again be followed. The most valuable defence against that air counter-attack which an aggressor might invite is a belt of small neutral nations; for the reason that a defending Power is thereby denied the use of forward aerodromes and bases from which to attack with short-range high-performance fighters. It has been obvious to the air staffs of continental nations for some years that Britain was relying on being able to use such bases in Belgium and Northern France, for not only Britain's fighters but also most of her bombers have had ranges which would not have permitted them to be used from British bases against a central European country. The wisdom of German policy in detaching Belgium from the Franco-British alliance at once becomes apparent. Hence the freely

offered and unconditional assurance which Germany has given Belgium. It may be argued that Germany gave Belgium a similar guarantee before 1914, but conditions now are different. In 1914 the guarantee gave excellent ground for a masked attack; therefore it was expedient for Germany to break her promise: from 1938 onwards Germany's expediency will be served by keeping her promise. The only guarantee of an international promise worth having in these days is a satisfactory answer to the question, "Is the expedience of the guarantor being served, *and is it likely to continue being served?*"

It has been said that Belgium was wise in accepting the new German guarantee. Belgium has nothing to fear from France and Britain whatever happens. Therefore her maintenance of that entanglement could gain her nothing and might cost her dear, while her acceptance of the German promise, the implementing of which is equally important to Germany, bids fair to keep Belgium out of the next European war. It should be remembered that the guarantee refers to Belgian territory and not to what may be described as Belgian air. It would be unwise for a small Power to press for a promise of respect for her air, and yet more unwise to place any reliance on such a promise, if extracted, for the following reasons.

International law with regard to sovereignty rights in the air is somewhat uncertain and has not yet been stabilized by custom. It is probably only a question of time before the presumed right of any country to claim sovereignty over the air space above its territory will

lapse: freedom of the air will come just as surely as freedom of the seas—for the same reasons and probably to a similar extent. Expediency governs these things. It is expedient for all concerned that there shall be freedom of the air, and it is expedient for a nation that it shall only claim sovereignty rights to an extent which it can reasonably hope to maintain. Thus it is probable that what may be termed “territorial air” will extend upwards for a limited number of feet only. Pending international agreement strengthened and solidified by custom in this matter, it may reasonably be taken for granted that if and when necessity demands, a great Power will take the air way across the dominions of a Power with which it is not at war, risking the diplomatic storm that will rage and being prepared to accept the arrest and internment of any of its airmen who may be compelled to land. There would be little risk in crossing small countries such as Holland and Belgium, for at the heights that military aeroplanes will be travelling they will have a gliding range which will command such restricted frontiers in all directions. Any attempt by a small Power to police the upper air will be taken as an act of war by the national owner of any aeroplanes which are molested. Upper-air intrusion unaccompanied by hostile action will not be regarded as invasion by a Power intent on finding the easiest way to an objective, and it is not likely that a small Power, or even a great Power intent on remaining neutral, will choose to regard it as invasion. After the experience of 1914–18 it seems almost certain that

nations not under attack will do their utmost to remain neutral.

The principal if not the only argument in favour of reprisal bombing has been that it is impossible for any defence to prevent bombers from getting through. This opinion is not held in Germany and Italy and it is significant that the fighter strength of those two nations is in greater proportion to their bomber strength than is the case with Britain. Since German and Italian single-seater fighters have about the same air endurance as ours, it is obvious that their rôle is to be of the defence-attack variety. Yet it must be admitted that the type of war which will be waged by Italy and Germany will require to be both strategically and tactically offensive. Therefore, if it was true that "the bomber will always get through," we should expect to find both Italy and Germany concentrating almost entirely on bombers and only arranging for limited defence for her civilian population. An aggressor must be prepared to take risks. At risk of receiving body blows he must put most of his skill and strength into the attack. Because he is "non-possessor" an aggressor must economize in material. The problem of bomber building is sufficiently difficult for a non-possessor nation, without an addition of (according to certain people in Britain) "ineffective" (!) fighters. The author suggests that the German and Italian views concerning the possibility of repelling bombers *in the air* are more correct than the British view. He happens to know that when the British decided not to inter-

vene in Europe in 1938 both senior and junior officers in the German fighter squadrons were very disappointed. The fact has great significance.

There are two ways of dealing with the air menace. The first is to seethe with righteous indignation and say: "All right; if you come and bomb me I will come and bomb you. And you can depend upon it I will do it a great deal better." This is the popular British way, and suits our impulsive combative natures admirably. The second is to say: "We have considered this business of bombing and/or gassing civil population centres and have come to the conclusion that unless a nation has lost its strength and courage, such action will do no more than intensify resistance. Therefore, if we are to presume, as we are quite entitled to do, that both ourselves and our antagonist will stick it out and remain virile, then the only conclusion of a war fought out on these lines would be the virtual annihilation of both nations. Therefore we shall abandon an attempt which is only likely to end in expensive failure, and concentrate instead on making a similar effort by our opponents so disastrously expensive that they will not be able to keep up the attack."

The first question asked by outraged bombees in Britain in any future war will be the same as it was in the last war—"Where are our airmen?" In 1915 we were able to explain that we had had no notice of the enemy approach and that consequently our aeroplanes were not capable of climbing to engagement point until

the bombers had left. Such excuses will not be tolerated in the future.

It is suggested that the only thing that will appease the civilians will be the knowledge that even though enemy bombers have achieved their object, only a few of them succeeding in escaping back to their own country. It is worth remembering that during the last war the exclamation of our civilians was not "Bomb their babies too" but "Shoot the baby killers." If the defence fails to shoot down bombers before or during attack, then the defence has suffered a reverse. This indignity may be to some extent avenged if the bomber is pursued and shot down on his homeward journey. If fighter and fighter-bomber squadrons are able to return to this country with a record of many bombers shot down over the North Sea, the Netherlands, etc., the attack having been maintained right down to the enemy's aerodromes or landing grounds, our civilians are going to be greatly encouraged and pleased and will tend to forget any injuries they may have suffered in admiration of a satisfactory military exploit. Compared with this kind of thing, a report of successful counter-bombing enterprise will arouse little enthusiasm. Britons are aware of the air menace and they are becoming watchful concerning the steps taken to deal with it. The days are probably not far distant when the British will inform their air force that they are paying it to defend them from an enemy, and not to go and knock seven bells out of that enemy's house, wife, and children.

What, after all, is a bomber? So far (1939) it is a fragile, unarmoured flying apparatus manned by a small crew faced with the necessity of uncertainly navigating an element which is hostile by reason of the weather, by reason of enemy action, and by reason of the fact that the duration in the air of a self-propelled flying apparatus is strictly limited by its fuel supply. While such a vehicle is manned by human personnel, it is absurd to say that it cannot be destroyed. Such an answer indicates "interest," or laziness, or ineptitude, or obstinacy. If an enemy comes in clear weather he can be seen and heard; that means he can be engaged; that means he can be destroyed. If he comes in dirty weather or in clouds, then he can be heard but it may be that before he can be accurately located or engaged, he will have dropped bombs: very well, he is somewhere above and he must return home within a short time, and the defender pilots know the way (or ought to) as well as he does. After him, then, with fighters and fighter-bombers. If he is not found or overtaken *en route*, then have machines waiting for him at his frontier. If favourable weather enables him to re-pass his frontier unobserved, then he must be chased to his aerodromes or landing grounds. He must come down somewhere, and he must come down first, because he has been up longer.

The air defence of Great Britain has for many years been designed, operated, and described as a shield. This is not its function. The "shield" is provided by the limited defence. The air defence should be regarded as

a spear. It should be capable of being pointed and used in any direction to keep the enemy at more than arm's length. It is only necessary to have observed the annual performance known as "the air exercise," to realize that there is something very much amiss. And the observation is made with the more regret because the idea behind the scheme is sound in essentials, and only breathing space is required in order to transform something lifeless into a very dragon of defence.

*Time is the essence of air
warfare*

6. ANTI-BOMBER ATTACK

Observation of an air exercise and study of the material given out to the Press before, during, and after the annual air exercise (material which, by the way, had not in 1938 changed except in detail for the past five years), does not provide any evidence of the fact that Britain has coastal reconnaissance squadrons. Nevertheless these exist and are variously equipped with flying-boats or land machines. The rôle of flying-boats in war tends to diminish with improvements in reliability and air endurance of land machines, but it is natural and perhaps desirable that a nation with such a maritime history as Britain's should continue to build flying-boats and endeavour to find a military use for them. Implements of war have a habit of going out of fashion and then coming in again, as the experience of the last war proved.

The title "coastal reconnaissance squadron" is obviously a relic of the last war, and the author is accordingly suspicious concerning the present strategic functions of these squadrons. If the title was changed to "strategic reconnaissance squadron" he would feel more reassured. Strategic reconnaissance machines are the cruisers of the air. Flying at great height within view of an opponent's frontier, they would be the "eyes" of

the air defence of Britain. It is true that the range of useful vision from an aeroplane with regard to other aeroplanes in the air is restricted. Nevertheless the situation can be remedied by adequate provision of patrolling aircraft. Opponents of this theory argue that an impossible number of machines would be required. The answer is that in warfare nothing is impossible and that where the defence of Britain against air raiders is concerned, one million pounds, or, what is more important for Britain, one million man-hours, spent on preventive defence, is worth five millions spent on digging holes in the ground.

It is not suggested that the whole of the air within visual range of an opponent's most adjacent frontier should be patrolled, but only the upper air from about 12,000 feet to 20,000 feet, which latter height is to-day (1939) about the maximum height attainable by bombers carrying a full war load of fuel, ammunition, and bombs, in the early stages of an enterprise. The tactical disadvantages under which heavily loaded bombers must operate have already been stated. Whether the Navy can maintain aircraft carriers in the North Sea or not, it will have to maintain observation ships equipped with sound locators, detectors, range-finders, and searchlights, and it will *have* to maintain ships which will be little more than floating anti-aircraft gun platforms.

On neutral territory such as Holland and Belgium the lower squeeze obviously could not be applied by artillery, but there seems no reason why Britain should not make an effort to establish a few locator, direction, and range

posts in certain directions. The apparatus is not bulky. In any case, there is an absolute need for the establishment of a branch of the Intelligence Service which could perform a function similar to that performed by the Observer Corps in Britain. There would naturally be more delay in the transmission of messages, but this could be compensated to some extent by reinforcing with air patrols the sea-borne observation line where it is cramped, that is, from the Hook of Holland to the mouth of the River Somme. The provision of a chain of intelligence posts in neutral countries which would link with the Navy observation line to the north, and the observation line established in France to the south, would tend to compel raiders either to cross their frontier very high up thereby entailing the loss of valuable fuel and time and rendering them liable to detection by our patrolling reconnaissance cruisers; or it would compel them to cross their frontier only within a cloud cover, in which case they would be liable to detection by sound locators.

Reconnaissance air-cruisers should be five-seater machines able to remain in the air for at least twelve hours at a time. They should be so designed as to be capable of maintaining height and position on a very economical expenditure of fuel. This could be effected by adopting sailplane principles of construction and fitting the engines with suitably designed variable pitch air-screws. The machines need carry only light defensive armament and would require to have a top speed which would enable them to run away from enemy fighters.

They should operate as single units, covering beats which would be measured in depth as well as in plan. They should carry sufficient personnel to enable two observers to be on watch all the time while two others rested. The pilot should be assisted by robot control and he could occasionally be entirely relieved for a short spell by one of the resting observers. The machines should be of sealed cabin type so that cumbersome and vision-impeding oxygen apparatus would only be required in emergency such as, for instance, the puncturing of the cabin by hostile action.

Reconnaissance cruisers should be reinforced by squadrons of three-seater fighters capable of keeping the air for at least six hours. So far as possible, while having regard to their fighting performance, these machines, like the cruisers, should have a great *range* of speed. They need not have aerobatic qualities. Their major rôle would be to harass bombers with long-range fire from cannon and heavy machine guns. In action near an enemy frontier against opposing fighters carrying batteries of quick-firing machine guns, these three-seater fighters would have to depend on their own longer range guns to keep a fighter at a respectable distance. They could negate his aerobatic qualities by using their speed range, so that they more or less stood still as soon as the enemy was within range. Similar tactics were adopted by R.E.8 pilots in the last war and now that speeds have increased, these tactics would be even more effective. The pilot should be assisted by robot control which could be used while the

machine was "idling." It is suggested that the armament of these machines should be entirely amidships, since the tactical purpose for which they are designed demands broadside rather than chaser firing. Broadside fire against a bomber formation's flank would work very well in co-operation with artillery fire from the ground. Flight tactics of these machines would be simplified owing to their not being under the necessity of having to indulge in aerobatics or make frequent climbs and return to position point.

Reconnaissance cruisers would not attempt to engage the enemy at any stage in a battle, nor would they leave their beat unless driven from it. Their duty would be to observe and report. They would be able to communicate with neighbouring reconnaissance cruisers, with the commander of the fighter squadrons in the air, and with the ground control station. If they were attacked they would "run," at the same time calling on the fighter commander not to protect them, but to send machines to the sector that had been vacated. According to the strength with which his units were engaged, the fighter commander would be in a position to judge in what sort of strength was the enemy and whether the attack was a skirmish or a driving in of outposts preparatory to the launching of a general attack.

The chances of an enemy being able to fly bomber formations entirely within the cover of clouds, are not good. If his frontier was being watched and guarded, he would require to wait for a cloud system extending all the

way from well within his country to a point beyond his targets. The strategic objections to this waiting are obvious. Unless his weather intelligence system was at least the equal of his opponent's observation intelligence system, he would not be properly informed concerning the likelihood of continuity of a cloud system, and in any case he could do no more than guess concerning the depth and horizontal evenness of the cloud fields. His passage within the clouds would be recorded by sound locators. As he approached the vicinity of his targets he would be awaited both on top of and below the clouds. Even before his emergence on the higher side his position would be given away, for the passage of an aeroplane flying near the surface of a cloud leaves a wake similar to that left by a ship in water. Similarly, before he emerged on the lower side of a cloud his position would be given away, for the lower side of a cloud hangs in festoons or curtains so that a machine becomes semi-visible from the ground even while the pilot's vision is yet obscured, for the machine passes through intervals so quickly that, to the pilot concerned, these intervals do not exist: nevertheless, they exist for those on the ground.

Naturally it is on the lower side of clouds that bombers would usually emerge, and the tactical advantage given at that moment to a warned and watchful defence is very great. The emerging machine not only becomes semi-visible before its pilot is aware of the fact, it becomes totally visible before he has had time to adjust himself to the changed conditions. This is not only accounted for by

the fact of the pilots having to change from blind navigation to visual navigation, but also by the time-speed factor.

Bombers on emergence on the lower side of cloud cover will probably in the first place be met by a salvo of artillery fire from ground gunners who will have a "line" from the sound locators and who will know the height of the clouds exactly, from previous information signalled by a defence machine. Only if the gunners miss with their first salvo will it be necessary for a fighter to take the next step in the affair of destruction.

The gunners may also be given the first opportunity at bombers which have emerged above clouds in too strong a formation to be engaged by patrolling fighters. It will only be necessary for a defending fighter to place himself at their height and as near as he can estimate to a given prearranged position in the rear or on the flank of a formation, and then send down a series of position calls. The gunners can then concentrate salvo fire which will at least have the effect of making the bombers break formation, which will in turn make them vulnerable to attack by defending fighters. Similar action can of course be taken in the case of "visible" raids, the position-call information providing a valuable check on the findings of the predictors and range finders. Neither Italy nor Germany are yet (1939) equipped with long-range fighters capable of escorting their bombers all the way to target point and back again, but if this lack is made good in the near future, then Britain will require yet more three-seater cannon fighters.

The final stage of bombing enterprise, that is to say, target engaging, will be very expensive for bombers, for not only will tactical flight variations have to be curtailed in order to give observers time to do their part, but when on the final bomb releasing course the machine will be required to be flown straight and at an appointed height. If the gunners miss with early formation breaking salvos, and if they again miss when bombers appear from within cloud cover, they will wait for this final opportunity. While the gunners are at cease fire will be the opportunity of the fighters. By this stage of the battle, single-seater fighters will have been brought up, and should be able to play havoc with bombers which by now have been constantly assailed either from the air or from the ground for many minutes. The change from one form of attack to another, heralded as it will be by a few moments of suspense, is likely to be very disconcerting. There is no need for the clumsy expedient of arranging "zones" for the respective action of fighters and ground gunners, which some tacticians advocate. The effect of such arrangement would inevitably be either a gap, which would be deplorable, or an overlapping, which would lead to confusion and later recrimination. Neither is there any need for an order or a signal. The fighters will have the visible enemy under close observation all the time: they will know when the gunners have fired their first bolt, *which will also be for the moment their last*; and they will receive warning, even in the heat of combat, before the gunners again open fire, because they will be aware that

the bomber has settled down on a bomb releasing course. Since, owing to the speeds involved, fighter action against bombers is almost entirely from the rear, the fighters will not tend to suffer much harm even though the gunners take a hand early in the second stage.

If sufficient bombers escape damage and succeed in regaining formation at the time when most of the defending single-seater fighters have descended for ammunition, the three-seater fighters which have been ordered up to replace those which followed the bombers to target point may delay their action until the gunners have been given another opportunity at a formation. By this time the morale of the bomber personnel will probably be considerably shaken. If they have had a severe struggle with fighters, they will tend to get back into close formation, feeling that being shelled from the ground is not so unpleasant as being gunned from the air. Pilots will be in a hurry to get home. There is nothing so conducive to a pilot's putting down of the nose of a machine in a straight and fast flight homewards as the knowledge that fighters are assembling along his intended route. Under these circumstances and at this stage in a bombing enterprise there is a tendency to disregard prudent course and height deviations in favour of "putting one's head down and running for it." This admirable opportunity for the ground gunners must not be interfered with by fighter action. Even three-seater fighters with comparatively slow-firing heavy armament, will need to conserve their fire and eke it out to the best possible advantage, because

on them will fall the responsibility of continuing the combat until such enemy as remain have again passed the frontier and possibly been met by escort machines belonging to their own side. At this stage in the battle the advantage will swing over to the enemy, because the defender's fighter-bombers, which will have been flying slightly in rear of the three-seater fighters, will be required to take up the pursuit and will inevitably themselves be attacked by increasing numbers of fresh fighters. It is suggested that this final stage of air battle will afford the greatest opportunity to and place the greatest responsibility upon the commander-in-chief in the air of all the defender's fighter and fighter-bomber force. According to his judgment, and according to the information given him concerning the air position high up and close to the enemy's frontier, he should have the power to call down to his assistance the fresh squadrons of three-seater fighters which will have been sent to replace those which left their area earlier in the battle in order to chase and harass the bombers in the initial stage of their attack. The decision will require to be made, bearing in mind the fact that the enemy may have further bomber formations on the way.

This is a picture of a bombing attack successfully dealt with at all points by a defender country, and it is a very different picture from the one that might be drawn as a result of observation of two or three years of annual air exercises by the Air Defence of Great Britain. Needless to say, the picture is one-sided. An aggressor is going to

take various steps in order to prevent himself being delivered so freely into the hands of the defender. But the point is, that he should be compelled to take such steps, and take them early in his bombing enterprise. He is not under such necessity at present. There are various expedients which he might adopt. The most likely one is that he will so time his offensive as to give his bombers a chance of slipping through the cordon of defender reconnaissance and fighter patrols during darkness, reaching the neighbourhood of his target area at dawn. If he was successful in escaping attention up to that point he would be in a fair way to make a successful bombing attack. Nevertheless, he would be liable to engagement very early by patrol three-seater fighters and from the ground by A.A. guns. During the later stages of his bombing attack the defender scheme would be in full operation, and the chase home would be the same as that already outlined.

Another strategic plan would be for the aggressor to send his bomber formations across his own frontier in successive waves at differing heights. This could be countered by putting a "flag" cruiser in command of each section of the patrol area, with two or three cruisers in support. One machine at a time could then be detached to shepherd each bomber formation and see that it was handed over to fighter defence and ground defence units with all available information concerning height, course, and numbers.

Besides variations in strategic plans, the aggressor would incorporate tactical variations in his attack. For

instance, he would, if he found A.A. fire very accurate, open his formation and instruct all his bomber pilots to fly at different heights while yet maintaining sufficiently close contact to insure that single machines could not be cut off by two or three defender fighters. This manœuvre would probably reduce his casualties from A.A. fire to a minimum but at the same time it would severely test his pilots, for it is much easier to fly in close formation at the same height than to fly in loose formation at differing heights. In order to prevent offering an easy target to the A.A. batteries it will be necessary for the bombers to "weave" their course according to a pre-arranged plan of intervals, and to make frequent alterations in speed and height, also according to a prearranged plan.

It may be taken for granted that there is an answer to every strategic and tactical problem. The important thing for the defender to arrange is that a problem shall be set as early as possible, and that he shall be ready with another problem as soon as the aggressor has satisfactorily solved the first one. The aim of the defender should be to insure that from the time an enemy crosses his frontier to the time he returns to his aerodrome or chosen landing ground, he shall either be under fire or be so shepherded as to bring him under fire. Because an answer to a strategic plan or a tactical manœuvre has not always been given, it is not intended to infer that there is no answer. On the contrary, there is always an answer, and an answer which the defender in particular must anticipate if success is to be achieved. As far as the defender is con-

cerned, plan and manœuvre must be prepared and practised while waiting on the aggressor, who will have a choice of many plans and manœuvres. To each there may be only one satisfactory reply. The defender must know all the answers even though the aggressor may not be able to set all the problems. Examples may be given.

It has been explained why an aeroplane emerging on the lower side of cloud cover becomes visible from the ground before the pilot is aware of the fact and has had time to alter his dispositions accordingly; and thereby becomes an easy mark for ground gunners. The tactical reply to this is for the pilot, the moment he *does* realize that he is clear of cloud, to go immediately into a steep turn and remain on his new course for thirty seconds or so. This might enable him to dodge the shell which had started on its way before he realized that he had become visible, but which will, according to his height, require a variable number of seconds to reach him. The reply of the gunners to this expected manœuvre would be to divide the first battery salvo in three directions, one covering the already indicated flight path and the others covering turns to right and left from that path. The reply by the pilot is not only to turn steeply in the first instance, but also to dive quickly. This would temporarily defeat the gunners, who would probably cease firing when they observed their initial lack of success, and leave the situation in the hands of waiting fighters.

One more example may be given. During the chase home of a bombing armada by defender machines, the

aggressor will probably arrange for his machines, after they have passed their own frontier, to fly very low. This would handicap the opponent's fighting tactics which might be yet further disorganized if he was led over a succession of pom-pom and multiple machine-gun posts.

The answer might be for the defender to armour the under sides of 50 per cent of his fighter-bombers and only allow machines so armoured to take up the chase at low altitudes. In this connection it may be suggested, "why not armour the under sides of all fighter-bombers?" Perhaps we shall come to that in time, but it can only be done at the expense of the useful lethal load which the machine can carry.

After an aggressor's plans have been guessed at, a defender's plans can be prepared. This sounds elementary, but it is surprising how often a defender makes his plans first. If an opponent is building fast, unarmoured bombers with an all-round light machine-gun defence, then a defender may be satisfied with fighters which are faster and which concentrate a volume of similar *but superior* fire in *one* direction. This is the point where strategic defence changes into tactical attack. Because the initiative passes to the tactical unit employed by the defender, that unit can select its direction of attack. Therefore it need only be weaponed to shoot in one direction. Therefore it will have superior fire *in that direction* as against the opposing machine, which must have *all round* defensive fire.

But supposing the bomber has all-round defence with

cannon? Then it is clearly no use opposing him with fighters armed only with light machine-guns, whether in batteries of six, eight, or even more. It would be equivalent to asking a boy armed with a pea-shooter to take on a boy armed with a catapult. The first-named would be able to get off three or four peas while the other was firing one pebble, but the pebble slinger would win in the end. Other things being equal, a heavy projectile will always overcome a light projectile.

The rôles of reconnaissance air cruisers, three-seater fighters, fighter-bombers, and ground artillery units, have now been briefly indicated, but very little has been said about single-seater fighters. Single-seater fighters are the "shock troops" of the air, and the pilots of these machines should be carefully selected, and encouraged to consider themselves as belonging to a *corps d'élite*. The author holds most strongly to the opinion that the man is greater than the machine and that a superior man in an inferior machine is likely to achieve more than an inferior man in a superior machine. This remark is not in conflict with the last sentence of the preceding paragraph, where the statement that "a heavy projectile will always overcome a light projectile" was qualified by the words "other things being equal."

The proper flying of a modern high performance single-seater fighter entails great physical and mental strain on the pilot. He is alone. He must both fly and fight alone, *and he must be his own commander*. By the time he comes to take part in a general air engagement, it will have

reached such a stage that he cannot be directed. The author disapproves strongly of that preliminary flight formation dive which is advocated in some quarters, but even if this be permitted, there the matter should end. There should be no attempt to re-form flight after such a dive. Such attempts can only lead to loss of precious time, and tend to take the pilot's attention off his job, which is to attack any enemy machine within sight and to continue to attack such machine until successful or until compelled to break off through unfortunate circumstance.

There will be times when an enemy machine is attacked simultaneously by more single-seater fighters than is necessary, and such action may lead to collisions in the air at the expense of the fighters, but the risk is worth taking. The discretion of individual pilots will ensure that on the whole their attentions are satisfactorily dispersed. Single-seater fighter attack should be in the nature of a cavalry charge, but no useful object can be served by attempting to reassemble them after they have once gone into action, because many of them will have expended all their ammunition. Time is the essence of air-warfare and useful time, as far as S.S.F.s are concerned, is measured in seconds. The only useful manner in which the action of these machines can be "spread" is to collect them in the sky at the beginning of their offensive enterprise, and throw them into combat in successive waves.

The fact that a single-seater fighter secures its magnificent climb and speed performance at tremendous expense

of fuel, and is therefore only capable of limited air endurance, is not so significant as the fact that it will probably exhaust its ammunition in one combat-attack. S.S.F. pilots should be taught to consider themselves and their machines as a single instrument designed to destroy bombers. If they can accomplish the performance once without using all their ammunition, so much the better: they are then free to turn their attentions in another direction. But if, after all their ammunition has been expended (possibly including bombs), they yet find that the target of their choice nevertheless remains in an air-worthy condition—then they must attempt to ram. The tail of the opposing bomber offers the most satisfactory target for this purpose, and if the fighter becomes uncontrollable as a result of a successful ramming attack, then the pilot must make the best use he can of his parachute.

Tactical attack must be made to follow strategic defence so closely that plan and action are weaved together in a close pattern. The picture the author has in mind is *not* two opposing sides on a football field, but two courageous expert animals engaged in mortal combat.

*The frequent result of trying to kill
two birds with one stone is to miss both*

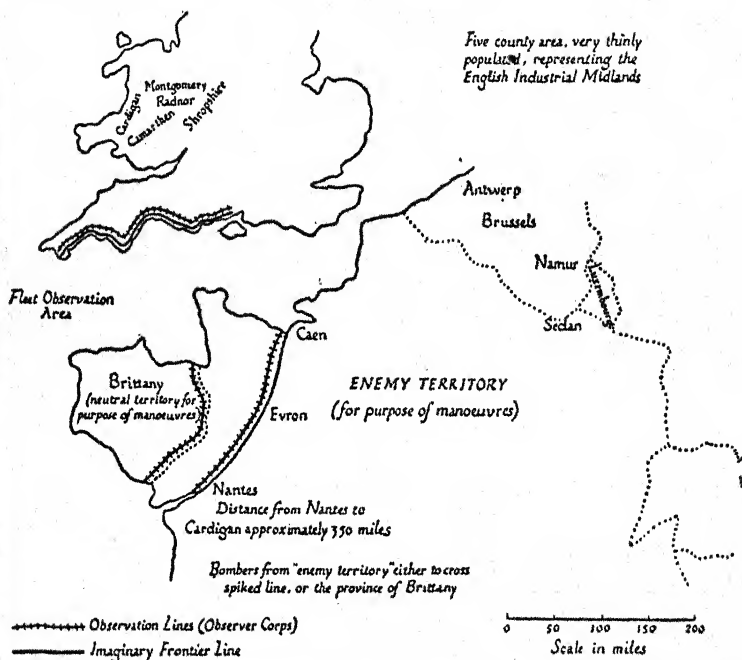
7. A MANŒUVRE SUGGESTION

It is plain that if the author's critical remarks concerning the annual performance known as "The Air Exercise" are justified, then something completely different is required. The exercise justified itself and its name once, but to continue in the present style cannot be satisfactory to any except perhaps the Germans and the Italians.

The author has suggested that it is not the present or the immediate future intention of any nation to air-attack Britain at home. In this opinion he is at variance with a great many people, including most of those who write or make speeches on the subject of "Air Defence," but he has given many reasons for his opinion. Yet there does remain a possibility of Britain being attacked at home, and that possibility will become a probability if we allow ourselves to intervene in a European dispute before we have furnished our armour and reaccustomed ourselves to the handling of weapons. The author understands that our hand might be forced in this direction and he approves therefore of combined defence manœuvres on a general scale, designed to test all theories concerning the proper defence of Britain against air attack.

First of all, it is suggested for the purpose of these manœuvres that the east coast of Britain might be re-

garded as an enemy's seagirt frontier. The British Navy could be invited to establish a line of observation similar



BRITTANY AND THE OBSERVATION LINE GUARDING
IT TO REPRESENT BELGIUM AND THE LINE FROM
DUNKIRK TO SEDAN FOR PURPOSES OF MANŒUVRES

to that already suggested in this book, but instead of the south end of the line being off Dunkirk, it could be moved up to a point about twenty-five miles west of the East Frisian Islands. This alteration would be advisable in

order to prevent alarm in the Netherlands. The line should be L-headed at the south end, the short arm of the L pointing in the direction of Britain; and T-headed at the north end. The length across the top of the T should be not less than fifty miles and the length of the short arm of the L should be about twenty-five miles.

The British Air Force could then be invited to attempt to pass fully laden bombers across this line in an easterly direction and to safeguard their passage by taking such action against the fleet as might be expected to be taken by an enemy air force under similar circumstances. The Navy should be required to maintain and operate aircraft carriers within the line of observation while detaching submarines, minelayers, torpedo flights, mosquito craft, and a force of destroyers, whose duty it would be to co-operate with the Air Force in an attempt to break the observation line and sink aircraft carriers.

This performance would complete the first phase of the manœuvres. The lessons taught would be practically expounded by the Air Force for the benefit of the Navy and of those responsible for the air defence of Great Britain. Except for incidental experience, especially with regard to the operation of machines carrying full war loads, the bombers of the Air Force would not be on test. This provision is made because those directing the Air Exercise have a tendency to try and find the answers to opposing problems in one and the same exercise.

In the next phase of manœuvres the personnel of the Observer Corps stationed in Lincolnshire, Norfolk, and

Suffolk should be moved to the French line Caen-Evron-Nantes. It should be noted that this line is, roughly speaking, the same length as the British line Grimsby-Harwich.

The French province of Brittany should be regarded as being Belgium, and half of the personnel of the Observer Corps stationed in Essex, Kent, and Sussex should be moved to the eastern boundary of Brittany. The reason for sending only half the Essex, Kent, and Sussex observers to the Brittany frontier is because the latter is only about half the length of the Franco-Belgian frontier which it is intended for the purpose of manœuvres to represent. The usefulness of the Observer Corps in Essex, Kent, and Sussex is no longer apparent, because, owing to the speed at which bombers can now travel, the results of observation on these coasts could only be communicated to the British Fighter Command too late to be of use. This section of the Corps should now be trained in observation to a flank, so that they shall be competent to observe above the Franco-Belgian frontier. Owing to the fact that the Caen-Evron-Nantes line is only half the length of the Essex, Kent, and Sussex coasts, and in order that all members should receive manœuvre training at the intervals they would be required to maintain in wartime, only half the Essex, Kent, and Sussex force should be used at one time.

Bomber squadrons equipped with the best bombers in the British Air Force could be stationed at French aerodromes south-east of the observation line in what, for the

purposes of manœuvres, would be regarded as enemy territory. They could be required, on separate occasions, to cross both the Caen-Evron-Nantes observation line and the province of Brittany at any point and any height subject to a ceiling limit of 20,000 feet, carrying full war loads of fuel and bombs. They should be required to fly in formations of not less than twelve machines. When they were attempting to cross Brittany they would be subject to observation, not only from the ground on the eastern frontier of the province, but also from a naval observation force placed off Ushant and using air patrols limited as to radius of action in the same way that they would be strategically limited in wartime while operating off Dunkirk. Except for valuable experience to be gained by flying fully loaded machines off strange aerodromes and navigating across strange country, the bombers would not be under tactical test. Neither should they be given any active rôle in the *strategic* scheme. They are there merely to impersonate the enemy.

There remains to be considered the extremely difficult business of arranging for standing observation patrols in the air on what may be described as the British side of the line Caen-Evron-Nantes. With reconnaissance cruisers as suggested by the author which would be capable of maintaining the air for twelve hours at a time and which would be specially designed to give two observers, working in conjunction with each other, an all-round field of vision, the matter would be comparatively simple. But some means must be found, in the absence of such

machines, of utilizing for a military manœuvre purpose such aircraft as are available.

The upper air space to be observed may be pictured as a wedge-shaped space ten miles across, extending upwards from 12,000 to 20,000 feet. It is suggested that it should be ten miles across because this would mean that even a bomber formation tackling it at right angles (year 1939) would be in the danger zone for two minutes.

Having regard to the range of useful vision from an aeroplane in respect of other aeroplanes, and having regard to the field of vision available to the personnel of particular aircraft, an estimate could be formed concerning the number of defence machines required to "observe" such a section of air space. According to the number of British machines other than single-seater fighters remaining available, either the whole of the observation space could be patrolled, or, if there were not sufficient machines available, then a part of the space could be patrolled. If only a part of the space was being patrolled, then bombers which crossed beyond possible observation distance could be regarded as having done so under cover of cloud. Another and better alternative would be to invite the French Air Force to co-operate.

The aircraft used for patrol observation purposes could be any Royal Air Force machine capable of carrying one or more passengers and capable of climbing to at least 12,000 feet and remaining there for an hour or more. Machines of poor performance could maintain the lower levels while the best machines went to ceiling limit, which, *in*

the case of the defence, would not be limited to 20,000 feet, but would be the maximum height obtainable and desirable.

In order to make the best possible use of their comparatively limited range, these substitute machines could be stationed during manœuvres at aerodromes in France close to the observation line on the north-west side of it. It is suggested that every first and second-line aeroplane in the Air Force at home save single-seater fighters and those bombers detached for attack purposes, should be sent to France for this manœuvre, and that the inevitable shortage of pilots and observers should be made up out of the reserve and auxiliaries. Lack of French aerodrome space would give an opportunity for practising from temporary landing grounds, and lack of trained maintenance personnel could be made up by borrowing from the French Air Force. If it was found that more than sufficient machines were available, then some of them could be used to represent the three-seater fighter squadrons which should be in the air in reserve. This would give an admirable opportunity to test signal arrangements between a selected number of machines filling the rôle of reconnaissance cruisers, and the commanders of squadrons of supposed 3-seater fighters. Such squadrons should be maintained fully ten miles behind the rear of the observed area, in order to give the Observer Corps every chance to spot formations which were attempting to cross it. Every *formation* within the observation area would be known to be enemy.

An enemy bomber formation would be regarded as

being discovered by a reconnaissance cruiser if a fairly accurate estimate of its strength, position, and course was signalled. The umpires would be correctly informed concerning the position of the supposed enemy at all times. In order to safeguard against unpremeditated deviations, or deviations compelled through weather, various checks, could be imposed, such as, for instance, the bombers being required to send down position signals at intervals.

In order to complete this phase of manœuvres satisfactorily, the British Intelligence Service could be required, in co-operation with the British Air Force Intelligence Service, to make "certain arrangements" in Brittany which was to be regarded for the time being as a neutral country. It is a pity to have to make this kind of suggestion openly, but the need for air information from the line Antwerp-Malines-Louvain, Namur and Dinant, if Britain was being air-attacked from Central Europe, will be appreciated by anyone who looks at a map. The second stage of manœuvres would terminate with the completion of this combined strategic exercise.

In the third stage, bombers would again be required to fly from French aerodromes, the line of their attack being over the British coast from Bournemouth to Land's End. This coast-line should be watched by the Lincolnshire, Norfolk, and Suffolk Observer Corps, members of which would gain valuable experience since the approach of bombers over the sea from France upon this south-west coastline of Britain would approximate fairly closely to a similar attack upon the Lincolnshire and Norfolk coasts

by an enemy who had escaped observation by the North Sea fleet. As in the previous exercise, the work of the Corps would be checked by umpires in possession of accurate information concerning the strength, position, and course of the various bomber formations while crossing the coast.

Mobile anti-aircraft batteries in Britain, together with searchlight and locator units, could be stationed in West Herefordshire, Montgomeryshire, Radnorshire, Carmarthenshire, and Cardiganshire. This area is intended to represent the English industrial midlands containing the bulk of our war munition plants. The bombers could be required to attack large targets represented by prominent physical features, all surrounding population having been previously removed to places of safety. Ground defence units would, of course, be some distance away and protected from splinters.

Two attacks could be made, one in clear weather and the other when the upper skies were completely cloud-obscured. Secret bomber operation orders could be signalled from the target area. When coming in clear weather the bombers could attack targets from 18,000 feet, and the author sees no reason why the gunners, provided that shells were safely fused, should not be permitted to shoot in accordance with instrument findings. Shells would inevitably fall short of the target aeroplanes, but useful course-finding and range-finding practice would be provided and both bomber and ground unit personnel would benefit by an approximation to the real thing.

When the bombers were approaching above a cloud layer, the information derived from sound locators could be supplemented by information derived from position signals sent down by a defence machine which was flying at a prearranged estimated distance and direction from each bomber formation. Gunners could then be invited to put up fire calculated to compel the bombers to break formation, the safety of the bombers again being reasonably assured by the shells being short-fused.

In the final phase of manœuvres, bombers could be ordered to drop below a cloud level in order to find and attack targets. The only *ground* defence units concerned with preventing them on this occasion would be sound locators, and this would afford opportunity to test the new locators, which are believed to be so sensitive as to be able to detect machines even though they are on the glide. The findings of the sound locators would be communicated to single-seater fighter commanders on patrol with their units about five hundred feet below the clouds. Both fighters and bombers would be armed with camera guns with a clockwork attachment recording when a photograph was taken. The bomber's bomb-release gear would be similarly fitted with time-recording apparatus, and the umpires would thereby be able to form an opinion concerning the likely results considered to have been achieved, either in combat action or in bombing action.

A very comprehensive plan has been briefly indicated. The author hopes he has said sufficient to indicate the practical possibility of a manœuvre scheme which has

obvious attractions, and which will receive its closest and severest criticism at the hands of serving officers of the British Air Force. The plan may be pulled about, extended here and contracted there, but if it be examined with an impartial mind it will be found to contain something more useful to Britain than that painful and unsatisfactory performance known as "The Air Exercise." Many purposes are herein served, not the least being that of co-operation with the French. The political desirability alone of such a scheme makes it worth the most careful consideration. Although, as has already been stated, the author is of the opinion that we cannot "conscript" the French in defence of the British Empire, yet we *can* count on their co-operation in the defence of Britain itself.

In pursuance of his theory that the man is more important than the machine, and hence also than the plan, the author suggests that the greatest care should be taken to ensure that the commander of the defence force in a manœuvre operation such as this should be strongly of the opinion that no bombing attack can successfully penetrate or escape from his defence mesh. There seems no need to make a similar proviso in the case of the commander of the bomber force, for so many air officers belong to the bomber school of thought; but if there should be any doubt in this direction, then the author suggests that command of this force should be offered to a committee of retired officers whose names it is not necessary to indicate.

If military reconnaissance was not undertaken during these flights, then the author does not know his German

8. AIDS IN DEFENCE

In an earlier chapter it was suggested that although air attack upon Britain might be unlikely, yet the danger existed and therefore it was advisable to protect centres of civilian population by every possible expedient.

When this book began to be written, it did not appear possible that British financial resources could possibly be overstrained by the size of the armaments bill she would be required to foot. But things have changed very considerably in the last eighteen months. Not only have we been compelled to find a lot of money for armaments already, but future bills are going to be terrific.

Therefore, although the really urgent problems of British rearmament are and will continue indefinitely to be connected with the business of the proper use of our man-power, yet we must also have regard to the purse.

What is defence? First of all, it is active defence implemented as far away as possible from Britain itself. (The example of Lord Nelson is again recalled for attention.) Secondly, it is active defence implemented from bases within Britain. Thirdly, it is limited defence with a sting in it, that is to say, defence which will hurt the enemy if he comes near enough.

Anti-aircraft artillery, with its ancillaries, the search-light, and sound locator units, is the best form of limited defence. Although these units are mobile in the strict sense of the word, they cannot be regarded as being mobile for the purposes of combating an air attack. You cannot chase 300-miles-an-hour bombers with ground guns even if these guns *are* mounted on 60-miles-an-hour motor chassis.

When it is recalled that the speed of bombing aircraft is to-day not less than three times as great as it was in 1918, and that they are capable of flying at least half as high again, it is natural to expect that the methods in use for dealing with them from the ground have been similarly accelerated. There is no need to go into detailed explanations concerning A.A. guns and the instruments for course and range finding, because these have been the subject of wide publicity and comment in the lay Press for some time, but readers with military knowledge will not require to be told that the business of estimating the course, direction, and height of a modern military aeroplane is highly skilled business—so highly skilled that some people who understand the problem are coming to the conclusion that it is time that the primitive method of endeavouring to bring down an aeroplane by throwing a lump of metal at it was replaced by something more scientific.

Nevertheless, it has been proved in China and Spain that even modern military aeroplanes can be seriously discommoded by A.A. fire, and therefore until a more

scientific method has been discovered and perfected, a nation will be wise to equip itself with the latest and best in guns and range- and course-finding instruments. Although a modern A.A. long-range gun can be fired at a rate of fifteen rounds per minute, yet during this minute the gun is being constantly relaid, so that the shooting required can be said to correspond roughly with that required from a sportsman using a shot gun against driven game.

The "eyes" of an A.A. battery are a range-finder and a predictor—two entirely separate instruments. The function of the range-finder is self explanatory. The predictor is an instrument which if properly handled records accurately the course of an aeroplane *so long as such aeroplane remains on that course*. The range-finder requires for its operation three men, and the predictor either five or six. Each of these men must perform simultaneously, or almost simultaneously, accurate manipulation and accurate reading. The result of their manipulation and reading is communicated to the gun crew who lay the gun and fire it. If the target aeroplane is flying very high, the shell requires several seconds for its journey.

It should be sufficiently obvious that unless the pilot of the target aeroplane is unaware of the fact that he is being aimed at, and therefore continues to fly on a set course without altering speed, the chances of the shell making a direct hit are very small. Not only is there a great liability for human error (particularly with the

range-finder), but the liability is present in eight human beings. There is also the factor of time-lag in communication which, though taken into consideration at all stages of the operation, inevitably increases the margin of error.

The average modern bomber (1939) can fly at a speed of 275 miles an hour. (Some are slower, some are faster.) Therefore in two minutes the bomber, without losing height, can cover approximately nine miles. Taking all circumstances into consideration, therefore, it is safe to say that even if a bomber is flying on a course which enables the guns of a battery to bear all the time, yet each gun in the battery will be able to get off no more than fifteen rounds at that particular bomber. And there will be many occasions when the target machine is out of range before half of this number of shots have been fired.

What are the chances of a hit? If visibility is good, if meteorological information with regard to the wind is accurate, if the aeroplane neither alters course nor height, if the gun directing personnel are highly skilled and practised—the chances are very good. Failing any of these conditions, the chances are poor. Therefore the chances of an aeroplane piloted by a skilled and well-trained pilot being brought down by directly aimed fire from the ground are not very much greater than they were in 1918.

Nevertheless, anti-aircraft fire from the ground is going to be valuable and may become more valuable. Aircraft have for the time being just about reached an ultimate of speed, but inventors and technical experts have not

yet finished with the gun. In the last war anti-aircraft units had to be satisfied with guns designed for use in the horizontal plane. They had a completely inadequate supply of such guns and were compelled by the force of circumstances to spread batteries out over a wide area. Bombing aeroplanes were not always compelled by enemy fighter action to fly in formation. Target areas were anywhere and everywhere. Strategic plans had not been designed to keep the bombers herded together and deliver them in a tightly packed bunch to massed batteries awaiting them around a target point.

Although the defence in each area of war has been operating under severe handicap, anti-aircraft gunners in China and Spain have met with considerable success. In the carelessness or the eagerness or the distracted attention of a bomber pilot, lies the opportunity of the gunner. A bomber who has been "observed," and who comes within range of a modern A.A. battery while flying on a "true" course, is in for a very unpleasant experience. If it is not a single bomber but a formation, then it is possible that several of the machines will be shot down and others will suffer damage.

The gunners will not attempt to plaster the sky as they did in the last war. If they miss with an early salvo they will wait for another opportunity, hoping that succeeding target machines will not have time to observe or guess at the battery position. Bomber personnel do not like being shot at from the ground. There is only one thing they dislike more, and that is being shot at from

the air. Heavy anti-aircraft fire will tend to make bombers sheer off their course, and if it is properly co-ordinated with air attack, bombers are going to follow the same course in the future as they have done so often in the past, that is to say, they are going to dump their bombs overboard regardless of target, and make tracks in the direction of home.

It cannot be too strongly emphasized, in contradiction of the alarmists, that indiscriminate bombing, even against a country so thickly populated as Britain, is not going to achieve very much. Anyone who wants to prove or disprove this assertion might try dropping tiny flour bags on a scale model of any great English city. They would probably be surprised to discover how many of the "bombs" fall in open spaces. And when a bomber is releasing his cargo indiscriminately it is great odds that the bombs will not fall within a built-up area at all but in the open country.

In a preceding paragraph the author suggested that anti-aircraft fire, if it was properly co-ordinated with air attack, had a great defence value. Co-ordinating plans can now be made on a scale and to an extent undreamt of in the last war; but a remarkable instance of satisfactory co-ordination between air attack and ground attack occurred in Britain as long ago as 1918, when enemy bomber raids on Britain ceased in the spring of that year owing to the heavy losses inflicted on their formations attempting to bomb London by night. Our single-seater fighters went up on the first warning of enemy

approach and waited above London until a British searchlight succeeded in picking up and holding a bomber within its light path. A fighter was thereby attracted to the spot, and usually shot down the bomber before the latter had become aware of the fighter's presence. This kind of thing is true air defence, and while it, or something like it, remains possible, a defender country need not waste money and man power on that excessively stupid form of warfare known as "reprisals."

Now let us consider another form of defence. It so happened that in the last war the provision of a sufficient number of searchlights, batteries, and fighter squadrons for the defence of London coincided more or less with the provision of a balloon apron. It was afterwards claimed, and the claim has been reasserted in these days, that it was this device which intimidated the enemy and kept him away. There is no evidence in support of this claim. There is no evidence that a single enemy machine was brought down by colliding with the screen, or with the cables, or with the balloons themselves. There is, on the contrary, a tradition that one German machine flew through the screen and escaped back to Germany.

Even, however, if the balloon-supported apron had been more effective in 1918, it does not necessarily follow that it would be effective in the same way to-day. Few of the aeroplanes in use during the last war could have been flown through a wire screen without suffering disabling damage. To-day there is scarcely a military machine which would be so disabled. Wooden airscrews

are almost entirely displaced by metal airscrews, and the strength of modern all metal machines is such that a wire entanglement which might have spelt disaster to a 1918 machine could to day be encountered without serious danger.

It may be suggested that the strength and closeness of the apron can be increased, but this involves an increase in weight and would therefore demand a greater lifting power. This means either increasing the size or the number of the supporting balloons. It is claimed that a triple row of balloons can now hoist a screen to the maximum height likely to be attained by bombers. Nevertheless, this is not so helpful as it sounds. It is something like putting up a single horizontal pole as an impediment for a flock of sheep—whatever height is chosen, the sheep either go under or over.

If the balloons are at a maximum height, they will be subject to considerable wind displacement. In high winds at any height many of the balloons will probably break away. In thundery weather it would not be safe to hoist them at all.

There is something to be said for the balloon screen idea if it could be made lethal in some way. Hints in this direction have been given but there is so far no evidence that the scheme is possible. The author is of the opinion that the only use for balloon screens would be to hoist them within clouds. In this way they might be as useful as is a minefield at sea, for it is very doubtful if an enemy would be sufficiently determined to "sweep"

ahead of his bombers with aeroplanes equipped for balloon and net destroying.

To hoist balloons into clear air is only to invite their destruction, for they are very vulnerable. During the last war it was a popular pastime among the more adventurous British pilots to shoot down enemy observation balloons, even though they were to some extent protected by an efficient A.A. battery. The reason why enemy balloons were permitted to fly at all on the western front was because their destruction invited similar action by the enemy in reprisal. British gunners found their own balloons so useful that they invited the Air Force to "live and let live"!

There seems one excuse for balloon barrages, even if only as a temporary measure. So long as our valuable military targets in the shape of armament manufacturing and assembly plants in the English Midlands are left huddled up within great centres of civil population as in Leeds, Sheffield, etc., we are inviting an enemy attack there. So important are these targets that a brave and resourceful enemy might fly low in order to identify and attack targets, which on so many days in the year lurk under a pall of grime-filled obscurity. From a tactical as well as from a strategic point of view, an enemy might choose to fly low when attacking targets in the English Midlands, because the same obscurity which makes target identifying difficult will also tend to conceal him from the attentions of defending fighters and gunners. In these areas, therefore, so long as they contain military targets,

balloon barrages might be useful. *If the balloons were kept below the ceiling of bad visibility, the barrage would not be conspicuous and in its inconspicuousness lies its only chance of success.*

In the English Midlands lies the most vulnerable target area in Britain. This district might be approached from the north-east by an enemy who would thereby escape the heavy concentrate of defence around London. His retreat would be severely contested, especially if it became known, as it probably would become known, that he had approached by a long detour across the North Sea; for fuel requirements would compel him to take the shortest way home; but this would be a cheap price to pay for a chance of unmolested approach, followed by a successful attack against valuable targets. It is most unfortunate that during 1936 the German airship *Hindenburg* was permitted to make leisurely flights at varying heights and at varying hours of the day and night all over the important war-production centres of the English Midlands. If military reconnaissance was not undertaken during these flights, then the author does not know his German.

While on the subject of the English Midlands, it seems worth while to point to the extreme parochialism of people living in a small, thickly populated country. Because for many years it has been an understood thing in Britain that London is the target which stands in most danger of being air attacked, the Northerners have not bothered very much about the subject of air defence. If

ever they come to change their opinion, it will be interesting to see what difference this makes in the matter of British strategic air defence.

The author's views on the subject of balloon barrages are contrary to the official British view, which *appears* to be to some extent shared by the Germans. Nevertheless, the Germans may wish to see the continuance of a scheme and an apparatus with which they see us pre-occupied. The author, who knows the Germans fairly intimately, has a high regard for their cunning in warlike strategem. Just as the author believes that it suits the Germans admirably to see us concentrating defences around London, so he believes that the German balloon defences have been devised in order to persuade British opinion of the usefulness of the machinery. It is noticeable that the German apparatus is far cheaper than the British. It is also noticeable that they have inexplicably (unless this author's opinion is correct) gone to the trouble of giving details to the news agencies concerning their balloon apparatus and its strategic and tactical use. The author is confirmed in his suspicions by the fantastic German claim concerning the cables supporting the balloons, but this claim is cleverly supported by the sound opinion that the usefulness of the balloons is dependent on their being flown under concealment. Military students will appreciate that we are not entirely dependent on clouds or mist to provide the necessary cover. Neither the British nor the Germans have gone to the length of suggesting that balloon-supported screens are the correct

protection for targets of military value. If the German ever decides to attack British centres of population deliberately in a wholesale manner (as most Britons appear to think he will), then his bombers will not be required to come anywhere near target point. From a distance the bombers would release rocket-glider bombs which can be directed with quite sufficient accuracy at a target as big as a city. It is significant that this weapon appears to be the only one that has not had a "try-out" in Spain. The author believes that the Germans intend to perfect the weapon and hold it in reserve to spring as a surprise against large targets of military value. Against rocket-glider bombs launched from a distance, balloon barrages would have no value and even anti-aircraft batteries situated around likely target areas would be useless. A British air staff view is that problems of stowage and launching of rocket-glider bombs prevents their usefulness in that the useful lethal load will be much reduced. But surely an opponent would be willing to send double the number of machines to a point outside the perimeter of the limited defences around valuable target areas? This type of bomb is not required by Britain until it has become an instrument of precision, but it is inconsistent on the part of the British air staff to be willing to postulate bombing attack of the "egg-dropping" variety upon centres of civilian population and yet have no regard for the rocket-glider bomb, even in its present state of development. The author feels that the rocket-glider bomb is meeting with a similar reception

to that accorded to the cross-bow, the culverin, the arquebus, and the matchlock, each in the early days of its development. We do not want to see a repetition of the 1866 example at our expense, when the German needle gun was one of the decisive factors in determining one of the shortest and most successful wars on record. One form of defence stands equally valuable, whether against "egg-dropping" bombers or rocket bombers. This is the fighter and the fighter-bomber. In the perfection of these weapons and of the plans for using them lies British safety.

9. A. R. P.

The author recently saw a letter written by an artisan living in a large town in the West of England to his brother, who lives in Canada. The personal portions of the letter are suppressed, but the following paragraphs are worth attention:

“ . . . Last September a lot of people from London and Birmingham came this way looking for lodgings. They came in fine motors.

“A woman neighbour of mine has an empty house up the road and a man wanted to take it for a month. My neighbour said she didn't want to let, and in any case if the house was wanted she should reserve it for children.

“The man held out a handful of £1 notes and said: 'What for do you want to bother with the children? Here's the money.'

“I wish he had said it to me. I should have told him something he wouldn't rightly have liked to hear.

“We were not frightened in September maybe because we don't listen to what they call 'the news.' Katy (his wife) says it reminds her of somebody selling things at the door, and I say it is like taking your breakfast off a conveyor belt,

"I said to Katy: 'When are you going for the gas masks?' and she said: 'Don't be silly.' I said: 'Aren't you afraid of being bombed?' and she said: 'Of course not: the Germans aren't quarrelling with us, they're quarrelling with Czecho-Slovakia.'

"I was surprised because as you know she's a busy woman and I never see her reading the paper. As far as I knew she didn't know whether Czecho-Slovakia was a country or a new kind of disease.

"Then I asked my eldest what he would do if the German bombers came. He said: 'No such luck. We aren't anywhere near any place they would want to bomb. I wish we lived in London.'

"Now what do you know about that? What hope have these blooming peace cranks got when a boy of ten talks like that.

"I shall get a steel shelter for nothing and it will do for storing the potatoes, but these shelters will have to be paid for by somebody. I expect it will go on the rates, which are already near as much as the rent. What do we want them for? If we were attacked I reckon it is a job for the Air Force.

"I'll tell you what I think. I think this A.R.P. is all my eye. Do you know what I call it: I call it R.I.P. . . ."

If the assumption is correct that if Britain is again air-attacked, the targets selected by the enemy for attention will be those of military value, then all that a defender need do, beyond surrounding his centres of civil popula-

tion with as many guns, etc., as he can afford to manufacture and man, is to provide really adequate shelter at and around targets of military value for such of the population as must work there and live nearby.

This opinion does not conflict with an earlier opinion concerning the incorrectness of affording full protection to military personnel engaged in maintaining items of a war machine. Such people are in a fighting service and must be ready to receive knocks accordingly. They are units in a shield of defence and such a shield *must* be interposed between an enemy and the civilian population. A civilian is none the less a civilian because he is making shells. Nevertheless, because of the nature of his work, he is a fair target for an enemy. He cannot afford the time to fight back if attacked, so he must run and hide until the moment of danger is past. By refusing to do so he might not only lose his life, which is entirely his own affair, but also deprive the state of his man-power, which is *not* entirely his own affair.

Civilians not engaged in the manufacture or assembly of munitions of war who happen to live in the immediate neighbourhood of such centres, should be removed *in time of peace* to safer areas. If important military targets happen to be situated in the middle of great cities, as in the case of the heavy engineering industry in the English Midlands, then it would be good policy to remove the target elsewhere, rather than attempt to deal with the problem of the surrounding population. Naturally some of the civil population would have to go with the targe

but it would probably in any case be simpler, cheaper, and more effective to design and build anew rather than attempt to modify something old. In any case many of the older engineering works in Britain are out of date, and in the long run it might be to the country's advantage to scrap and rebuild. It is fortunate that, in order to escape high rating, many of the newer factories which would be listed as "war targets" for military purposes are already outside city and urban areas.

In the opinion of the author, the target areas of Britain fall under one of three heads. Under the first heading are areas in the occupation of civilians where military munitions are being made, assembled, or stored. The stores themselves are valuable, but not so valuable as the lives of the civilians. Since it cannot be denied that such areas are targets of military value, then it must be agreed that they are subject to attack. Since successful attack cannot be *entirely* prevented, then the civilians, including their wives and families, should be afforded really adequate shelter-protection.

Under the second heading are areas in the occupation of civilians engaged in ordinary civil pursuits. In the opinion of the author no enemy will wish to attack such civilians and will only do so under one of the following three conditions:

- (a) Suicidal desperation.
- (b) In reprisal for similar attack.
- (c) By the wilful or unwitting mistakes of his tactical formations.

In the opinion of the author, the first condition can be adequately safeguarded by our politicians and by public opinion, both in aggressor and defender countries. Obviously the second condition is governable by those directing the air-military policy of a *defender* country. As for the third condition, if enemy bombing personnel are going to attack civilian population centres in defiance of orders to the contrary, then they are going to do so in a half-hearted manner, having great regard to the business of escaping afterwards. For if they are brought down they are not only in for a rough experience at the hands of the bombees, but they are going to incur the severe displeasure of their own countrymen. Therefore if the defence puts up a really massive shell defence around such centres, it is likely to be effective in driving off the attackers. Similarly a really massive shell defence is going to warn off the unwitting attacker.

The power stations, gasworks, railway junctions, etc., which some people hold will be liable to attack, are situated within the heart of civilian population centres, and therefore the author is of the opinion that they are reasonably immune. For if you are going to smash these you are going to smash civilians, and it would be entirely unreasonable to demand that your opponent should remove city populations from around such areas. The author is of the opinion that if we are going to be air-attacked we shall (possibly at the last moment) receive notice concerning targets which are to be attacked, *not in particular but in general*, and that it will be found that

these targets are all of undoubted military value. Under present circumstances, for instance, there would be every justification for an enemy scheduling Leeds, Sheffield, and Coventry, to name three places only, as "military targets." On the other hand, there would be little or no justification for their so naming London.

The question of ports is more debatable because although these are absolutely essential for the British civil community, some of them at least are also essential for the British military machine. The author is of the opinion that much will depend on the anterior circumstances of the next war (if any). If our opponents feel that the game is in their hands, they will probably offer immunity to a few ports in England on the understanding that if they detect misuse of the privilege they will withdraw their promise of immunity. If, on the other hand, they embark on war with Britain as a last desperate throw without much hope of success (which is highly unlikely), they will probably list all our ports as military targets.

British target areas under the third heading are areas in the occupation of military units. One of the reasons why we did not go to war in aid of Czecho-Slovakia in 1938 was because our military targets at home were vulnerable. Nevertheless, the author is more afraid concerning over-defence in these directions than under-defence. He knows the higher military mind, with its extreme sensitiveness to hostile action. If the air war alarmists who have plagued Europe for years had been right, the safest place

in Britain any time this last ten years would have been within a military unit. Actually, both in 1935 and 1938, it was British military units and bases which stood in the greatest danger, and the British military mind has at last awakened to the fact. It has been suggested earlier that an opponent should be encouraged to attack Portsmouth rather than Southampton. This is how he might be so encouraged. Southampton could be ringed around with many batteries of quick-firing anti-aircraft batteries aided by sound locators and searchlights, together with numerous multiple machine-gun posts. The defence of Portsmouth, on the other hand, might be left to such naval ships as happened to be in the dockyard or dockyard basin, assisted only by one or two batteries of 9- or 10-inch guns disposed to the west of Portsmouth. Defending fighters might go into action against raiding bombers *after* the air-line above and around Southampton had first been "secured" by a force of fighters disposed somewhat higher than the bombers. Not until this area had been secured would other fighters attack the bombers from north, east, and south, and endeavour to force them over the heavy guns on the west of Portsmouth at a prearranged height. The idea behind the suggestion that the Portsmouth guns shall be few in number is to attract the enemy away from Southampton. The idea behind the suggestion that the Portsmouth guns shall be of 9- or 10-inch calibre, is that although they would not have the opportunity of firing very many times, the radius of action of their bursting shells would be very

considerable, and if they only fired by prearranged ambush plan, they might prove fairly deadly to individual bombers without unduly upsetting the personnel of other bombers who were feeling that, although the neighbourhood above Portsmouth was unhealthy, that above Southampton was far more unhealthy.

All this is an argument against A.R.P. If Britain does not look out, she is going to be saddled with a very heavy A.R.P. burden in the shape of a vested interest. The warning is concerned not so much with the business interests involved (though these will be immense), as with the vested bureaucratic interest. Britain is going to pay heavily in cash and in freedom for one more set of governmental chains stamped with the royal arms on one side and the Union Jack on the other. It will be suggested that indifference to A.R.P. is equivalent to disloyalty.

The fact that the Government is sponsoring A.R.P. to please the taste of a vociferous section of the British public may explain matters but it does not afford sufficient excuse. "Afford" is the operative word. The author suggests that not only is A.R.P. unnecessary, except around targets of military value, but that a large proportion of the British do not want it, and that, where large centres of population are concerned, it simply cannot be done.

It is worth considering what A.R.P. is going to entail if it is to be really efficient. Unless the government indicates, by abolishing the civilian gas mask, either that gas attack is not to be feared or that it can only be safely

encountered in a scientifically designed bomb and gas-proof chamber, everyone will be required to be skilled and practised in the wearing of a gas mask under gas conditions. Unless property owners have been kind enough to turn premises into bomb- and fire-proof fortresses, everyone will want an allotted place in a trench or dug-out system. The whole population will be required to practise evacuation of premises and streets at inconvenient times. Plans will have to be made to accommodate "extras" who are caught at some considerable distance from their appointed refuge. If people go away for more than a few hours they will be required to report themselves "off" the strength of one A.R.P. officer and "on" the strength of another. The second officer will have to make arrangements for such people to be allotted accommodation and shown where it is. Those who live in the west of England will have to be ready to don their gas masks and go to their appointed place of refuge whenever enemy bombers are reported over eastern England, but their lot will be pleasanter than those who live in eastern England, for so far as can be judged these will have to carry their gas masks with them wherever they go, and arrange never to be more than a couple of minutes' travel from an air-raid refuge.

The author does not believe that there is much risk of gas attack upon British civilians, for the same reasons that he does not believe that civilian centres of population as such will be bombed. He holds to the belief yet more firmly, because he is aware of the great technical diffi-

culties of delivering effective gas attack. A gas attack from the air would achieve a military object if the personnel of A.A. batteries, etc., and the ground forces generally, were compelled to don gas helmets which impaired their shooting effectiveness. Obviously, if this manœuvre was being attempted, it would be in the form of bombs and not from low-flying pipe delivery machines, and gas released from bombs has a way of going anywhere except up the noses of those for whom it is intended. Possibly the gravest risk of gas attack would be during those attacks on military manufacturing and assembly plants which it has been agreed are to be regarded as military targets. If Britain does not remove such targets from within great cities, then she is inviting serious disaster. The proper protection at such centres is not gas masks but gas-proof chambers, for the reason that it is neither convenient nor desirable to train and practise civilians, as they would require to be trained and practised, if their immunity from gas attack was to depend on their wearing of a really efficient gas *helmet*, which is quite a different thing from the British civilian gas mask.

There remains the question of gas decontamination. The author suggests that this work should not be undertaken by civilians at all, but by properly trained, equipped and practised troops. If the author's views are correct, gas will be, as far as civilians not employed on military duty are concerned, an incidental affair. That is to say, either the centres where such civilians live will not be attacked, or, if they are attacked, it will be by accident

or half-hearted design and the attackers can be driven off by various forms of active defence before they have done much damage. Nevertheless, even though civilians employed on military duty are provided with proper shelter, the areas around these shelters, and the scene of their normal work, will require to be decontaminated before they can be allowed to emerge and carry on. The affair is a military one. A military risk must be guarded against and military need requires that work shall only be interrupted for the least possible length of time. It is not reasonable to expect that the work of decontamination around a military target area should be effectively and expeditiously carried out by civilians, who live elsewhere and are normally otherwise employed. Neither is it expedient that the work should be done by the civilians themselves. Each man to his job. Gas decontamination work could be made a part of the normal routine training of military units composed of men who are not physically fit for more active forms of service, or who are considered to be over the age for fighting. These men would be required for various responsible and dangerous defence duties of such a nature that they have a right to demand that they shall be put into military uniform and recruited for whole-time service in peace time. Britain cannot afford to try and get vital defence services "on the cheap."

That which applies to gas also applies to fire. The risk of fire in large centres of civilian population not containing targets of military value is even less than the risk of

gas, for the reason that an enemy is not likely to risk valuable machines and yet more valuable personnel on a hazardous expedition whose final achievement is fire-raising. He knows that the fire menace is not so great, and can be much more easily, cheaply and effectively countered, than the explosive risk. In the author's opinion the fire menace can be countered already, by Local Government orders in connection with buildings old and new, and by a reinforcement of the standing fire brigades, which is in any case already overdue. Here again then the answer, in the opinion of the author, is fully trained and practised men who are whole-time employed in peace, in the same manner as they will continue to be whole-time employed in war.

It may be suggested that the author seems to disapprove of the amateur. He does, to the point of horror.

For final consideration comes the question of damage to danger areas containing civilian population (i.e. armament production centres) by high explosive. Here we come up against the question of corrugated iron shelters and deep dug-outs. The author approves of the former in the same way that he approved during the last war of soldiers wearing shrapnel helmets, and he is of the opinion that there should be a free issue of such shelters to all homes within built-up areas in Britain *on demand*. He considers that the shelters should be provided on the strict understanding that it is a matter of luck whether residents would be better off within them or within their homes. If a home is hit directly, the occupants may or

may not be killed or injured; if a shelter is hit directly, there is no question about it at all; all the occupants will be killed. Discretion in the matter should be left entirely to individuals.

With regard to business premises, it is the author's opinion that the safest place will be vertically in the middle of the building. Raised at least fifteen feet above the ground level, occupants of multi-purpose buildings will be reasonably secure from splinters from bombs which burst at ground level (where most bombs would burst). With a roof and preferably a floor or two above, occupants will stand a fair chance of escape from direct hits, because either the bomb will go straight through and burst at ground level, or it will burst on impact and so scatter itself through unoccupied space. Fire risk and gas risk arising out of high explosive bombing which shatters underground communications can be, to some extent, guarded against by cutting off supplies at the mains on first warning of enemy approach. For the rest, this should be the affair of those augmented fire and salvage brigades the necessity for which has already been indicated.

What should be done with the street population? The author suggests that the capacity of buildings in cities and towns should be ascertained, and each building scheduled to accommodate a given number of extra occupants *within the confines of the same space as that afforded to the building's resident population.*

He suggests that each building so scheduled should, for air-raid purposes, be in the charge of a controller and a

deputy-controller and that in time of war one of these individuals should be required to be always within the building during the hours of its daytime occupation. He suggests that each scheduled building should have its ground and first floor windows fitted with steel shutters, and that any doors opening on the street should be guarded by a steel curtain which could be lowered from above. Behind the curtain there should be a compartment capable of holding at least a dozen people, and it should be possible to close this compartment on the inner side by another steel door.

The controller or his deputy should be in charge of the door. He should be able to drop the outer steel curtain as soon as the compartment was full, and would only raise it again when the compartment had been emptied within and the inner door again closed. Street doors leading to refuges should be clearly marked as such, and there should be one every fifty yards on either side of a street. Street evacuation should be practised frequently and at all times of the day so that any problems in connection with peculiar circumstances could be solved in time of peace. In the opinion of the author, street wardens are unnecessary.

What is A.R.P. as at present being planned and organized? The author suggests that it is a policy of scuttle, a policy of presenting one's posterior to the enemy, a policy of makeshift and a policy of make-believe. The author would be careful of civilians not employed in military duties up to a point, but he cannot

see that their lives should be absolutely assured to them. The people who will decide that Britain shall go to war in the future are the civilians. If British civilians decide that they will not allow their nation to go to war, then that will be the end of the matter. If British civilians decide that, rather than comply with the demands of an enemy, they are willing to endure attack at home, then they can consider their individual prospect of survival in the various theatres of activity and "choose a better 'ole" if they know of one. If they are willing to take a risk which they are not satisfied to permit to their wives, children, and sick or elderly dependents, then there will be plenty of time to arrange for the evacuation of these people to safer areas before hostilities must be endured, for that complete surprise attack, literally "out of the blue," with which alarmists threaten us, is a stupid myth only sponsored by incredibly stupid fanatics.

*Where my opponent can fly,
there can I fly also*

10. CONCLUSION

It has been stated that the man is more important than either the plan or the machine. The time has arrived in Europe when ownership is going to be decided, not so much by wealth or material, as man-power. If the men of other nations who already outnumber the British are working hard and long and loyally, then Britons must work hard and long and loyally. There are implied criticisms throughout this book concerning those responsible for the air-military weapon. Since charges of incompetence or laziness could not be supported, can some other reason be found for an unsatisfactory state of affairs? The author suggests that it can.

There are (1939) over two hundred and twenty officers in the General Duties branch of the Royal Air Force who hold the rank of Group Captain or above, most of whom would, if they had been in either the Navy or the Army, not yet have reached equivalent rank. Yet although these officers have had very rapid promotion, they are not what might be described as "a young lot." Possibly because the work of creating a new Service has fallen on their shoulders, most of them seem to have grown old before their time. It is doubtful if fifty out of the two hundred and twenty could fly unassisted a 1939 type first-line

aeroplane, and it is quite certain that such flying would be confined to a gentle take-off from a good aerodrome in good weather and a thankful return to the same aerodrome a few minutes later. The days when an air officer commanding could arrive at a station over which he was to take command for the first time, flying himself in a single-seater fighter whose trickiness was a by-word in the Service, seem to have passed. It is a pity.

✓ As a result of permitting senior people to sit in offices while junior people do all the flying, the Royal Air Force has become over-administered and under-exercised. Those who are old enough will remember that the carriage horses of an elderly under-exercised master were almost invariably themselves overfed and under-exercised. An example set at the top is quickly followed. Because senior officers are out of touch with the practical flying of modern first-line aircraft, more abuses than one have crept in. The *military flying training* done in the Royal Air Force in Britain in one year bears an unsatisfactory relation to the number of officers and other ranks engaged. If a member of Parliament wants to make himself obnoxious to the Air Ministry, let him ask for the number of flying hours done individually by officers of the General Duties branch during 1938 as solo or first pilot in a first-line machine, and then let him ask for details concerning the nature of the flying.

Because Britain suffers from a disastrous climate (from a flying point of view), one might expect to find that most of the flying done is in the nature of tactical

exercises. On the contrary, most of it is "flying practice." The author was once asked by an American what was meant by "flying practice." After explanation had been given, the American said: "Oh, I see. Just zippin' around. Ain't you guys fortunate?"

The author knows from bitter experience how annoying it is to arrange a tactical exercise time after time, only to have it washed out on account of the weather; but the attempt nevertheless should be persisted in. It is odd that comparative inactivity in the air should go with comparative inactivity on the ground, but the fact stands.

"I seem to have spent the whole of my five years 'standing by,' " a short service commission officer was once heard to mourn. When the results of the examination of certain short service officers for permanent commissions or medium service commissions came out in 1939, it was to be observed that a far higher proportion of failures came, not from commands abroad where flying weather is generally good, but from the home command. Nevertheless it is only fair to point out that officers serving abroad would probably have, on average, slightly longer service.

And what about working time? The Royal Air Force, instead of being required to adopt the Navy leave period, as it should have been, was allowed to adopt the Army leave period. That is to say, subject to the exigencies of the Service, all officers are entitled to sixty-one days' leave each year on full pay. Not all of them take it, but a good many of them do. Those who do not take their

full leave are usually keen and efficient officers who feel that they cannot be spared. If these cannot be spared, then why should the others be spared? Why should the efficient have to do the work of the inefficient? And what business could support executive and administrative officers all of whom were led to expect that they could have two months' leave a year, and most of whom were enabled to take advantage of the offer?

The position of the other ranks is equally absurd. They are entitled to twenty-eight days' leave a year on full pay and allowances and a great proportion of them take it. In addition, they get several extra days' holiday in the course of a year and two half-holidays a week. Embarkation leave and re-engagement leave are additional, and on an equally generous scale. There is no business corporation in the world that could support such expensive labour as is supported in the British fighting services.

It has been said that the Royal Air Force is over-administered. Some idea of the extent of over-administration may be gathered from the fact that the useful working hours per man on a R.A.F. station are not more than thirty-two hours per week, even if the camp living quarters are close to the hangars and workshops, which in many cases they are not. This statement can be checked by Parliamentary inquiry. The time required should be the time from each "dismissal for work" to the time of each "fall in for return to living quarters," less the periods allowed off for "break." The wonder is, not that

the R.A.F. gets so little practical air-military training, but that it gets as much as it does.

The author makes three suggestions:

1. That a sharp line be drawn between executive and administrative posts in the Royal Air Force, and that executive officers take precedence, and that they be required to perform a considerable part of their duty in the air in first-line machines. This requirement should apply right up to and including the Chief of the Air Staff.

2. That the authorized maximum leave periods for both officers and men should be reduced by half, and that the working week be extended by at least four hours.

3. That further expansion of the Royal Air Force should cease until the machine has had time and opportunity to "find" itself and become a really efficient weapon capable of striking out in all directions and under all conditions in defence, first of Britain, and then of the British Empire.

The main arguments of this book are as follows:

1. Indiscriminate bombing from behind the cover of clouds is not a satisfactory form of air attack and is not likely to achieve any measure of success against a virile enemy.

2. Visible bombing attack can be summarily dealt with before it reaches target point.

3. The correct answer to bombers is fighters, not reprisal bombing.

4. A defender country must dance to the tune called by an aggressor country, and if the aggressor does not choose to bomb civilian population targets as such, then the defender dare not initiate such attack.

5. The next war between first-class Powers will not be decided in the air.

6. In the next war, the various military machines will perform against each other, and not against civilians.

7. If Britain is attacked, it is more likely to be in the direction of her outlying possessions than at home.

8. If Britain is attacked at home, the direction of greatest danger will be from over Holland and Belgium.

9. Britain will win or lose the next war according to how she organizes her military man-power while yet at peace, and not according to the treaty dispositions which her politicians may make.

10. The British Empire cannot be held by an Air Force, however strong.

11. The military planning and armament of a defender nation should be different from those of an aggressor nation.

12. A.R.P. as at present (April 1939) being planned and organized is unnecessarily extravagant of man-power. It will never be efficient and much of what is being attempted is unnecessary.

It is not the purpose of the author to deny danger of attack or to exalt the powers of the defence so much as to deny that overwhelming advantage lies with the bombers

of to-day. When those who are afraid have shaken off their fear, then those who are contemplating attack will have to reshape their weapons. There is nothing more certain than that they will do so, because war is only a continuation of policy; but when aggressors are put to the laborious and expensive process of reshaping their weapons, then the defence has won a round. It is high time that the defence won a round, for it has lost two. The present methods of air attack and ground defence are primitive. That a bomber with an expensively trained crew should be required to fly in a straight line above a target and let fall a lump of metal vertically is not more absurd than that the defence should endeavour to bring the bomber down by throwing a lump of metal at it. Yet while things remain as they are, it is absurd for the defence to admit inferiority. The watchword of the defence might well be:

“Where my opponent can fly, there can I fly also.”

So long as those who live in defender countries can be frightened to the point of making concessions, old and out-of-date machinery of forceful persuasion will be much in evidence on the side of the aggressors. It is suggested that the policy of air warfare preparation in Britain should be concentrated in one direction above all others—counter-bomber action. Counter-bomber action is aggressive defence. If the bomber is engaged early in his adventure and if the engagement is maintained either until he is driven down or until he makes good his

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retreat into an underground hangar in his own country, then the defence will stand. If, on the other hand, those who live in a defender country get it into their heads that it is necessary to run away and hide from the bomber, then the defence will fail.

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